POPULAR Computing WEEKLY

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This Week

News Desk

Prism hit by computer crime

THREE thousand Spectrums were stolen from a warehouse in Hornsey on Sunday, June 26 The stolen Spectrums, worth approximately £380 000 were being stored by Prism prior to distribution to retailers

A four strong gang faked an accident outside the ware house An employee who opened the gate to help was threatened with a sawn-off shotgun Two lorries were then filled with Spectrums and driven off

Coincidentally 200 Sanyo MBC 400 computers were recently stolen from a container lorry The 16 bit machines are so new that they have not even reached the dealers yet — the stolen models were the first batch

● Although TV programmes like *The Consultant* have stressed the increasingly soph isticated use of computers in crime these thefts are a reminder that the micro industry is also susceptible to more conventional crime

Oric software disagreement



Paul Kuczora of Salamander

SALAMANDER is angry over Oric s decision to change its software plans

Marketing manager, Paul Kuczora, said We had a letter of intent from Oric — we were promised they would take 5 000 cassettes a month from us

The problem derives from Oric s plans to issue its own software — provisional agree ments were reached with a number of independant software houses to supply prog rams that would be issued under an Oric label, Salaman der chief amongst them

Paul says that Salamander

Continued on page 5

Continued on page 44

★ ★ BRITAIN'S HOME COMPUTER WEEKLY ★ ★


WINDOW ON ANOTHER WORLD
NEW RELEASES FOR DRAGDN 32
FRANKLIN'S TOMB £9.95
Franklin's Tomb is an adventure for one player. Can you, as Dan Diamond, solve the riddle of the crypt, or will you fall prey to its mystery as so many others before you. Franklin's Tomb comes complete with a 20 page fully illustrated case file.
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Salamander Software



7-13 July 1983 Vol 2 No 27



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All submissions should be typed and a double space should be left between each line Please leave wide margins

Programs should whenever possible, be computer printed

We cannot guarantee to return every submitted article or program so please keep a copy. If you want to have your program returned you must include a stamped addressed envelope

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

This Week

Editorial

Is the writing on the wall for the ZX81? Is the micro that launched a thousand video games coming to the end of its natural life?

These questions are not entirely rhetorical, for they affect everyone who has bought a ZX81 together with all the subsidiary industries that have grown up around it

When the Spectrum was first launched, over a year ago now, a number of people predicted that the days of the ZX81 were numbered But they were wrong Sinclair dropped the price of the ZX81 and it continued to sell in respectable quantities

However, Sinclair has subsequently cut the price of the Spectrum to combat the threat of competitors like the Dragon, Oric and Aquarius Admittedly Sinclair also reduced the price of the ZX81 again, down to £39 95, but with the 16K Spectrum at £99 the differential between the two machines in closing Why after all, pay £39 for a black and white micro with 1K of Ram when, for an additional £50, you could buy a colour micro with 16K Ram?

Sinclair can undoubtedly drop the price of the ZX81 yet further and still make money on it But, with the Spectrum also likely to come down in price again, it may be easier to dispense with the ZX81 entirely

The ZX81 is unlikely to disappear immediately, certainly not before Christmas, but the chances of it being around for Christmas 1984 are looking remote

Next Thursday

Do you have the skill and the daring needed to complete Bomber Run? Find out in next week's Star Game for the Commodore 64 by Les Allan

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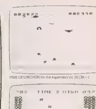
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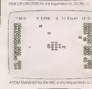
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[illegible]

Expanded VIC 20 [illegible]

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BBC (Model A or B)

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Dragon

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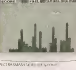
ALL THE ABOVE GAMES COST £9.99

ZX81

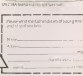
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Oric software

Continued from page 1

was never told of Oric's move out of software and that they only found out by reading about it in the computer press.

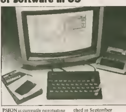
Neither Oric nor their tape duplicating company Cosma could tell us what was going on.

Oric software distribution has now been taken over by Tansoft.

Tansoft managing director Paul Kaufman said: "We have been left in a bit of a mess. I know some people are not getting the orders they were hoping for, but we are distributing Salamander's own Oric programs — we are on good terms with them."

John Tullis, Oric chairman, explained: "All that happened was that we decided to leave the software side to the people who know best — I certainly don't think that any firm orders were affected."

Psion to sell Spectrum range of software in US



PSION is currently negotiating with Timex to sell its Spectrum range of software in the US. The software will be converted to run on the Timex/Sinclair 2000 machines due to be launched in September.

Technical director Charles Davies explained that it was easy to convert Psion's Spectrum programs to the TS2000 machines, because their programs did not use any Spectrum Rom routines. "The only real differences between the machines, as far as converting software is concerned, involves the joysticks and sound generation," he said.

Providing the deal is satisfactorily concluded — a settlement is expected within days — most of the software will be released on cartridge. Prices have yet to be finalised, but Timex has already revealed that its cassettes will cost between $9.99 and $19.95 and its cartridges between $12.95 and $29.95.

All the Psion range will be included in the deal, except for *Planetoids*, *Space Raiders* and possibly *Scrabble*.

● Little Genius, which has the home computer rights to *Scrabble* in the UK and has a licencing agreement with Psion, is currently negotiating with US firms Felchow & Righter and Ritam for the US rights.

Vid Kid hits the big time

THE Vid Kid is a weekly column about home video games that is syndicated in 11 different newspapers throughout the United States. The writer of this column, Rawson Stovall, is just 11 years old.

The column first appeared in the *Abilene Reporter-News* a year ago. The then 10-year-old Rawson approached the paper's executive editor Dick Tarply with the idea for the column and four samples of his work. Dick Tarpley liked the idea and snapped up the column immediately.

Other newspapers which now carry the column include *The Odessa American*, the *San Jose Mercury* and *Universal Press Syndicate*.

Rawson hopes to have his column appear in more than 100 newspapers by the end of the year.

Fuller's premises damaged by fire

FULLER Micro Systems Liverpool base has been hit by fire. The damage is estimated at between £6,000 and £7 000.

Thieves apparently broke into Fuller's premises at 17 Sweeting Street on Saturday, June 25, between 10.30 pm and 11.30 pm. After stealing £2 in cash, they set light to the premises before leaving.

Fortunately, an architect working in a neighbouring building spotted the fire and called the fire brigade.

This upset is not expected to affect Fuller's production of keyboards and sound boxes, though a few individual orders may be affected. Retail manager, Frank Lawton, explained that the second floor of the building was unaffected by the fire, enabling Fuller to carry on as usual.

Fuller — after the fire

"In any event," said Frank, "we were planning to move to new premises in Dale Street in four to five weeks anyway. This has just speeded things up a little."

£69 interface

A NEW £69 interface will connect any RS232c 423 micro to an Olivetti Praxis 30 typewriter.

Further details from Tim-tom Micro, 9 Ilton Road, Penylan, Cardiff CF2 5DU.

Ace software

REMSOFT has almost doubled the software available for the Jupiter Ace by putting out 15 new titles.

These include utilities like *Toolkit/Screenkit* for machine-code programming and screen handling, *Character Designer* (16K) for user-definable characters, *Picasso* (19K) for drawing and saving pictures, *Strings* (19K) giving 40 string-handling commands and *Ace Assembler* (4K) and *Dis-assembler* (6K).

Other packages interface the Ace to either a Sinclair ZX printer or to the Tandy GP115 four-colour printer/plotter.

Games tapes include *Frogger*, *Aliens* and *Graphic Golf* (all 19K).

More details from Remsoft, 18 George Street, Brighton BN2 1RH.

Atari/Commodore — the battle continues

THE Atari/Commodore legal tussles over the rights to the *Pac man* copyright continues.

Originally scheduled to come to court in June, Atari has presented changes to its claim which will delay the hearing till October. Commodore has complicated the proceedings by withdrawing its contentious *Jelly Monsters* title, replacing it with *Cosmic Crunchers*.

Acorn's BBC micro — ready for launch in US

THE BBC computer is to be launched in the US within the next few months. Acorn has set up an American counterpart, Acorn Computers Corporation, in Massachusetts.

The US machine is basically a model B, with a number of 'extras' fitted as standard. These include an interface for disc drives and the View word processing chip. Other changes concern adapting the Model B for the US tv system.

Price is $955 — well above that of the Commodore and Atari home micros.

Senior Vice-President of ACC, Harvey Lawner, said: "There is a lot of interest here in the BBC as an educational machine — the BBC tv computer programmes have been taken by 220 of the 280 Public Broadcasting System channels."

Dare YOU enlist as a Free-System warrior?

My creators are Cable Software and their new game **"DRONE Datatank"** *has been reviewed as "the roughest, toughest arcade game to hit the Dragon scene to date"*

Dare **YOU** *enlist in attempting to destroy the evil "Rom Guardian" who will be protected by his army of "Drones" "Bugs" and "Bytes" determined to protect their Master at all cost.*

Will you be able to manoeuvre your Datatank through the Grid Zones and Memory Tunnels whilst fighting off the enemy attacks and avoiding the many perils you will encounter

Dragon Owners prepared to volunteer for active duty in my task force will receive my pre-recorded training message to help them succeed, but because of the many dangers involved, only the courageous should apply to enlist for this difficult mission

If you think that you are brave and skilful enough for this task, write to our Headquarters Address below Give details of your name and address, enclose a cheque/P O for £8 75 and by return you will receive all you need to begin, including a Program and Training Cassette, a "Top Secret" Datatank Instruction Manual and a Keyboard Overlay (used to prepare your computer for action)

If you join me in this valiant crusade GOOD LUCK in your efforts.

T.R.O.F.F. (Training Robot Officer of the Free-System Federation)

Dragon Software Retailers keen to recruit volunteer "Drone" fighters into their own Battalion can contact us for details of our trade terms If you decide to phone us, our scrambler is operational 24 hours so don't worry about bugging we are permanently on battle alert

Any programmers who wish to join us in ensuring that the best programs will always be "available by Cable" should contact us with details of any original programs written and will hear about the attractive prospects we can offer for marketing any program good enough to meet our very high standards

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GRAPHIC PLANNING PADS (100 Sheets A3 — 11¾" x 16½") The large size sheet allows the incorporation of an enlarged high resolution grid with the pixel coordinates numbered on all four axis to allow easier visual planning when programming graphics Structured reference sections are clearly defined to enable all relevant information to be detailed on the same sheet, making it simple to refer to if problems are encountered when running the program Pads are available for Spectrum Dragon 32 and BBC

GRAPHIC PLANNING GRIDS (100 Sheets A4 — 8¼" x 11¾") Each grid is designed for use with specified micro-computers, and is a low cost aid to programmers wishing to develop their skills in designing high resolution graphic displays Grids are marked on all four sides with pixel reference numbers appropriate to each computer for which they are available (Spectrum Dragon 32, BBC and Oric) An ideal aid for beginner and expert alike

A3 Pads at **£5.98** and A4 Pads at **£2.99** (which includes VAT and postage) can be ordered direct from PSL Marketing State name & address and type of computer when ordering and enclose your cheque or P.O

Your local Dragon dealer should also be stocking the Logic-Plan range but if you don't see any on display tell your dealer that he can obtain supplies from us at 24 hours notice

ANY DEALER NOT ALREADY STOCKING LOGIC-PLAN SHOULD DO SO QUICKLY CONTACT US NOW!

Copy-cat programs

I must first congratulate you on your stand in refusing to advertise those software libraries who lend tapes against the wishes, or without the permission of the manufacturer, a matter about which I wrote to you last December.

I turn now to the question of software protection against the abundance of "Copy-Cat" programs that are being advertised in your and other magazines.

Let me first set the record straight as a programmer by saying that, however hard we try, there is no way of making a program completely copy-proof, especially when it is on a tape cassette. We all use techniques which make it as difficult as possible for the average home user to break into a program and, indeed, without a good working knowledge of machine code it is usually very hard to do so.

"Copy-Cat" programs change this. They are purposely written to undo the "locks" and make copies. With their aid anyone with even a poor working knowledge of the English language can make copies.

The producers of "Copy-Cat" programs must realise that the vast majority of their sales will be used to copy commercial programs from friends and neighbours, thereby breaking the copyright act. It may seem like a "great deal" to the home user who is getting all this "free software" for the price of a copying program, but let me warn such short-sighted people that the more programs that are copied, the lower are the sales of the genuine article. Less money returns to the authors and manufacturers who then have less incentive and less capital to develop new programs. The end result of all this would be fewer manufacturers and authors selling a narrower range of games at higher prices to cover their costs.

I find it ironic that many of the customers who write to magazines complaining about the "exorbitant" and "outrageous" cost of games are themselves inching up the price by home piracy of these programs.

In an effort to avoid the main use of "Copy-Cat" programs, the advertisement "blurb" usually takes the selling line that the program "allows you to make back-up copies of your precious programs". Firstly, you do not need a copying tape for programs that you yourself have written, since you will know the details of any locks you have built into it. Secondly, if the manufacturers of commercial programs were willing for you to make back-up copies then they would supply details of how to do so. *They do not.*

Now, the "Copy-Cat" seller still has the dubiously valid point that your tape might get mangled by your recorder, put through the washing or erased in a nuclear holocaust, and then what do you do? In my experience (and I have used a large number of tapes for a long time) I have yet to lose a program in such a manner, but I do accept that there is always a very small chance of this happening. With this in mind I make the following suggestion.

All software houses (and this is something that could be agreed on within the newly-formed GOSH-Group of Software Houses) should operate the policy that if a customer's cassette becomes inoperable for any reason, then it will be replaced on receipt of the damaged cassette by the company with a new cassette of the same game. This would either be done free of charge or for a nominal cost of around 50p to cover the new cassette and postage (library case and inlay card would not need to be replaced).

This policy is something that would cost the software houses very little if anything, since the cost of bulk cassette duplication is around 45p a cassette, and anyway the replacement rate would be very low.

This simple measure would remove what little excuse the "Copy-Cat" sellers have, and we would then feel justified in asking the computer press to ban their advertisements and the retailers to ban their product. Since a blank cassette on which to make a "back-up" costs 50p anyway, it would also make it uneconomical for the user to do so.

It is very difficult to make working tape-to-tape copies (I have tried it with one of my own games), so I can only assume that most home piracy is done with copying tapes. It is therefore worth noting by the software houses that the banning of such tapes would greatly reduce copying of cassettes lent by libraries or under the "Buy 'n Try" scheme, thereby making such schemes more acceptable to them.

I look forward to the hopefully favourable reaction of yourselves, GOSH and any other software houses to my proposal.

David M Webb
Southolme
9 Park Road
Woking
Surrey GU22 7BW

Reliable compiler?

I am looking for a reliable compiler for my ZX Spectrum 48K. Could you advise?

About a week ago I purchased *Jetpac* from Ultimate Play The Game and I am still amazed at the graphics. I would like to congratulate Ultimate for producing such an excellent program. If all their games are going to be like this I shall be sitting on the edge of my seat eagerly awaiting their publications.

J Hosking
Tower Farm
St Buryan
Penzance
Cornwall

If you look at our 26 May-1 June issue, you will see that we reviewed Softek's Super C compiler for the 48K Spectrum. Personal Software Services also produces a compiler — Mcoder — for the Spectrum. Softek is based at 329 Croxted Road, London, SE21 and PSS is located at 452 Stoney Stanton Road, Coventry CV6 5DG.

Will it run the bath?

I read with interest in this week's *PCW* (16-22 June) that the CES Consumer show in Chicago went off with great success. But what interested me even more was the bit about the new Timex computers. As many people may know, Timex and Sinclair work together in producing the Sinclair computers in the UK. But, looking at the American computers (the Timex Spectrum ones), I wonder just who is getting the better deal.

The three computers that Timex have produced carry the Sinclair logo and are licenced from Sinclair Research. Now, unless I have left something out, I fail to understand why the American Spectrums are better than ours?

To give an example, the TS2048 computer (equivalent to the 16K Spectrum) has a number of additions that are not present on our computer. Namely, better design, improved keys, silver finish, more Ram, I/O ports and other sundry items — all this for only £98 (the £ = $1.52).

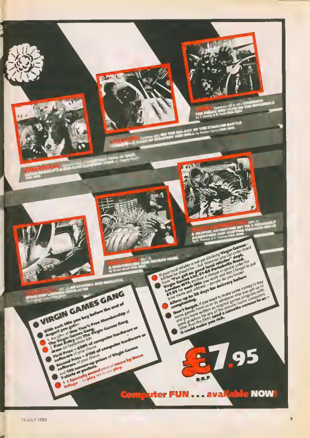
The ZX81, or rather the TS1500, has been done up — moving keys, better design and an internal 16K Ram and costs only £50. Surely "Sir" Uncle Clive must know what's going on. Why couldn't he have given us the TS2048 etc, instead of putting up with the prototypes? The British people have had to wait months, put up with flat or dodgy keyboards, Ram pack wobbles, "crashes" and other idiosyncrasies whilst the Yanks get the debugged, polished, gleaming computers that we should have had in the first place.

It's the old cliche "British Brains, American Gains." Clive must realise that it was us and not the Americans who gave him the opportunity to make computers. I suppose that when (and it's a big when) the Microdrives arrive and the British "guinea pigs" have fallen in love with it, it will wing its way over the pond and the Yanks will add a few bits on and reduce the price with the result of a better drive. Does the TS in the TS2048, etc, stand for Timex/Sinclair?

I suppose that when the flat tv comes out the Yanks will give it a round screen (for all-round entertainment, get it?), put in stereo speakers, add a video, make it talk to you, dry the dishes, get your slippers, run the bath and other items at a cost of $3.99, not forgetting $2 p&p.

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R.R.P.
Computer FUN . . . available NOW!

Mini Pacman

A new game for Vic20 by Richard Watson

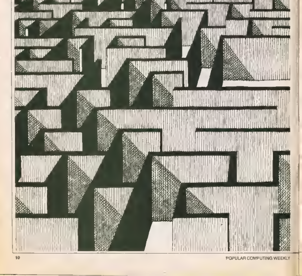
Mini Pacman is another game based on the maze-chase theme. You must eat your way around a maze while avoiding being eaten by the attendant ghosts.

This program is designed for a Vic20 with Super Expander, but it will work on an unexpanded Vic if you delete line 920 and change line 320 to 320 *K = Peek (197)*

The program makes use of user defined graphics and can be played with either keyboard or joystick.

Variables

I – counter
R counter
A = data
M = direction of movement
SC – score
M (1 & 2) = the ghosts direction
M (1 & 2) = the ghosts direction
J = joystick
K = keyboard
MO – movement
X = random number
A$ = get



```
2 REM ****************
3 REM ** R.WATSON'S **
4 REM ** MINI PACMAN**
6 REM ****************
7 REM
9 POKE 36878,15
10 POKE 36879,8
20 REM
22 REM **** INITIALISE ****
25 REM
30 PRINT"▒▒▒▒▒   MINI PAC-MAN"
35 PRINT"▒                 "
40 PRINT"▒▒▒▒▒▒BY R.WATSON."
42 FORR=1TO1200 NEXT
50 REM ** DEFINE CHARACTERS **
55 POKE 56,20 POKE 52,20
60 FOR I=7168 TO 7223
70 READ A POKE I,A NEXT I
80 REM ** DATA FOR CHARS **
100 DATA 60,118,252,240,240,252,126,60
110 DATA 50,110,63,15,15,63,126,60
120 DATA 28,62,42,62,62,62,62,62
130 DATA 0,0,0,24,24,0,0,0
140 DATA 0,0,36,24,24,36,0,0
150 DATA 0,255,255,255,255,255,255,0
160 DATA 126,126,126,126,126,126,126,126
170 M=7703 D=1 C=0 SC=0
172 G(1)=8110 M(1)=-22
175 G(2)=8118 M(2)=-1
200 REM
202 REM **** DRAW GRID ****
205 REM
207 POKE 36869,255
210 PRINT"▒▒EEEEEEEEEEEEEEEEEEEEEE",
215 FOR I=1 TO 5
220 PRINT"FCCCCCCCCCCCCCCCCCCCCF",
230 PRINT"FD▒EEEE▒ ▒EEEEEEEE▒ ▒EEEED▒F",
235 PRINT"FCCCCCCCCCCCCCCCCCCCCF",
240 PRINT"F▒ ▒EEEEEEEEEEEEEEEEEE▒▒ ▒F",
245 NEXT I
250 PRINT"▒▒EEEEEEEEEEEEEEEEEEEEEE",
255 PRINT"▒                    ▒",
260 PRINT"▒                    ▒",
265 POKE 8185,160
270 POKE M,C
272 POKE G(1),2 POKE G(2),2
275 POKE 7900,160 POKE 7921,160
300 REM
302 REM **** MOVE PACMAN ****
305 REM
310 REM ** INPUT MOVE **
315 IF PEEK(197)=64 AND RJOY(0)=0 THEN 400
320 J=RJOY(0) K=PEEK(197) MO=0
325 IF J=1 OR K=09 THEN MO=-22
330 IF J=2 OR K=26 THEN MO= 22
335 IF J=4 OR K=17 THEN MO=-1
340 IF J=8 OR K=18 THEN MO= 1
360 D=MO
370 IF D=1 THEN C=0
380 IF D=-1 THEN C=1
400 REM ** MOVE PACMAN **
405 POKE 36876,220
410 IF PEEK(M+D)=2 THEN 900
415 IF PEEK(M+D)<>160 AND PEEK(M+D)>4 THEN
    D=0
420 POKE M,160
422 IF PEEK(M+D)=3 THEN SC=SC+10
423 IF PEEK(M+D)=4 THEN SC=SC+30
425 M=M+D POKE M,C
430 IF M=7900 THEN POKE M,160 M=7920 POKE
    M,C
435 IF M=7921 THEN POKE M,160 M=7901 POKE
    M,C
490 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒SCORE ",
    SC,
500 REM
502 REM **** MOVE GHOSTS ****
505 REM
510 FOR I=1 TO 2
520 X=INT(RND(1)*3)+1
530 IF PEEK(G(I)+M(I))=5 OR PEEK(G(I)+M(I)
    )=6 THEN 550
540 IF X<>1 THEN 600
550 X=INT(RND(1)*2)+1
560 IF M(I)=1 OR M(I)=-1 THEN 580
570 IF X=1 AND PEEK(G(I)+1)<>6 THEN M(I)=1
    GOTO 600
575 IF X=2 AND PEEK(G(I)-1)<>6 THEN M(I)=
    -1
576 GOTO 600
580 IF X=1 AND PEEK(G(I)+22)<>5 THEN M(I)
    =22
585 IF X=2 AND PEEK(G(I)-22)<>5 THEN M(I)
    =-22
600 IF PEEK(G(I))=0 OR PEEK(G(I))=1 THEN
    900
602 POKE G(I),3
605 POKE 36876,0
610 PO=PEEK(G(I)+M(I))
615 IF PO=5 OR PO=6 THEN 550
620 IF PO>160 THEN 550
650 G(I)=G(I)+M(I)
660 POKE G(I),2
665 NEXT I
670 GOTO 300
900 REM
902 REM **** EATEN ****
905 REM
910 PRINT"▒▒▒▒▒▒▒▒▒▒▒▒▒▒GAME OVER"
915 POKE 36876,0
920 PRINT"T683DDT5DDT6FT5EEDDCT6D"
930 PRINT"▒▒▒▒▒▒ANOTHER GAME"
940 POKE 198,0
950 GETA$ IFA$=""THEN950
960 IF A$="Y"THEN POKE36869,240 RUN
970 IF A$<>"N"THEN950
980 POKE36869,240
985 POKE 36879,27 PRINT"▒▒" END

READY.
```


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From the top down

***David Kelly** talks to Robert Branton and Geoff Boyd of Memotech*

Memotech is still little over a year old, but it is growing at a phenomenal rate Even Robert Branton — one of its founders — says that everything is going so quickly that at times it s a bit worrying

At the Earls Court Computer Fair last month the company launched its own micro — the MTX500 — and joined the vanguard of UK companies challenging the US and Far East electronics giants at their own game

Memotech was formed in the spring of 1982 by two university researchers — Robert Branton a mathematician was the software expert and Geoff Boyd an engineer was the hardware specialist

Initially the company built a name for itself manufacturing add-on units for the ZX81 computer In March a 16K add on was built followed in June by a 32K pack, a high-resolution graphics board and a Centronics interface unit

Business was fairly quiet in the UK with over 70 percent going overseas — after all the Spectrum had just been launched in Britain However, in August Sinclair suffered supply problems with its own 16K Ram pack and many of the high-street chains looked to Memotech to provide an alternative

All this time Robert and Geoff had been working on their own computer — the SM1 Development was funded by sales of the ZX81 add-ons and since they intended to undertake their own manufacture of the new computer, they took the opportunity to gain expertise in manufacture from making the printed-circuit boards and carrying out the component insertion for the add on memory packs

Memotech's new offices!

In December last year, Memotech moved to its present premises at Witney just outside Oxford And in the true tradition of the new technology companies Robert and Geoff — waiting for a new factory to be built — are real Portakabin kings with 22 of the things stacked up on site

First thoughts for the design of the SM1 machine evolved two years ago In January this year the design of the SM1 was modified to make it a true personal computer and thus the MTX500 was born It has 32K Ram and 16K video Ram based on the Z80A chip with 16 colours, high-resolution graphics and a professional style keyboard with separate numeric and function pads

Robert Branton (left) and Geoff Boyd

Important features of the MTX500 are its communication possibilities — with Centronics twin RS232 twin joystick tv monitor and hi-fi ports plus cartridge slot its graphics and screen handling, its built-in programming tools and its price — only £275

In many ways its nearest competitor — although it doesn't have any machines with which it can be immediately identified — is the Acorn BBC micro

Geoff is anxious that the machine is seen in its context as a development *down* from a complete business system the SM1 He feels the MTX500 has a completely different design philosophy from the BBC machine whereas the BBC machine was designed from the bottom up, the MTX500 was designed from the top down — to the minimum entry point. That is the only way *he* says, that it is possible to know that all the peripherals work from the start A typical line of expansion from an MTX500 according to Geoff, might be the basic MTX500 followed by Rom-based additional graphics and sound commands, a single 500K 5¼ inch floppy disc system, as an entry into CP/M a printer a 256K or 500K silicon disc a card cage an 80 column board to make best use of the CP/M and a 10M 5¼ Winchester hard-disc unit

The 16K Rom of the MTX500 incorporates some unique features. The machine uses a Basic variant developed by Memotech — its own MTX-Basic Single keyboard entry works like BBC Basic with letters and dots — E for *Enter* for example And the Rom also includes sophisticated screen-handling involving up to eight virtual screens and a built in Assembler/Editor for machine-code programming

Using the virtual screen command it is possible to define a given portion of the display screen to be — as far as the computer is concerned — the whole screen This means that the computer can operate on one part of the screen — one virtual screen — independently of the rest

Material can be edited on screen before being committed to the computer's memory Typing *Edit* defines the virtual screen being accessed as an editor You can then type in and correct material before pressing the *Enter* key to enter the information

The virtual screen capability is ideal also for animated graphics particularly since the computer has a sprite (moveable graphics characters) facility It is also unusual in that one of the 16 colours is transparent Not much use you may think but, for example the transparent colour can be used to make dominant sprites *appear* to pass behind less dominant ones — whilst in fact they do still pass in front

The MTX500 uses the TI99/18 graphics chip and has 16K video memory To make good use of the graphics handling the computer incorporates some Logo-type commands in its Basic — *Move Advance, Rotate Left Rotate Right.*

The computer has a text mode of 40 x 24 characters and a high-resolution graphics mode of 256 x 192 pixels Text can be put on to the high-resolution screen in a 32 x 24 format It is possible to switch modes from text to graphics and back at will without losing anything

Perhaps the single most interesting feature of the MTX500 is its front panel display Accessed from the Basic with the command *Panel* it shows three virtual screens — the machine s built in machine-code assembler/editor and disassembler The screens show the CPU registers and their contents, a selected block of assembled machine-code and its assembly-code equivalent

Having used the front panel to assemble code you can then disassemble it More than that, you can then execute the code — one *instruction at a time* — and see what is happening A boon for de-bugging machine-code programs

Software for the MTX500 is now under way Already Memotech has five machine-code games written — *Toado Kilopede, Super Minefield, Chess* and *Draughts* A word processor, spreadsheet and accounting programs are on the way

The machine will, at first only be available through specialist computer shops — starting in September Memotech expects to sell production, one-third to the UK one-third to the US and one-third to the rest of the world ■

In other words . . .

***John Scriven** looks at a range of word processing, filing and graphics programs for the BBC*

When you have just paid out the best part of three or four hundred pounds on a computer, then to simply use it to play *Space Zappo* seems rather wasteful. The BBC micro is certainly good for games but more and more people are looking for serious uses for their investment. The same sort of argument applies to schools — a very large section of the ownership.

The business potential of the BBC machine is an area that is only just beginning to be tapped. I should like to consider at the present, the more serious side of this computer.

Word-processing (or W-P) used to be far too expensive for ordinary mortals until packages began to be written for the most elementary of machines. The idea behind W-P is that the computer is used to store text. This can be saved on a filing system and recalled at a later date. The text can be altered, formatted (set out as required) and finally printed.

Dedicated W-P machines tend to be both expensive and complicated and most users do not need all the facilities offered. Buying a software package for your micro can give you the opportunity to store letters, diaries, in fact almost anything you would previously have typed or written. You need a printer, of course, but with the prices of these down to around £200 they are often the first choice for a peripheral.

There are two word processors available on Rom chips for the BBC: *View* from Acorn and *Wordwise* from Computer Concepts. I use *Wordwise* myself and it has several advantages. As it is on Rom, it does not take up any of the BBC's memory, leaving space for some 4,500 words. It is also available immediately on power-up, needing only "*W" to be entered. It does, however, cost £45 and needs at least a series 1.0 operating system. Cassette-based systems take up valuable Ram but have the advantage of being roughly a quarter of the price and of working with any model B.

H & H Software produce a W-P package on cassette or disk called *Alphabeta*, costing £14.50. On loading, a menu is displayed giving you the option of loading previously stored text, reviewing existing text or loading instructions. These are fully formatted and can be used to practice altering commands or moving blocks of text around.

The text is stored in line lengths of up to 80 characters but is displayed in mode 7 (40 characters). This means that the screen acts as a window which can be moved from side to side or up and down over the text, using the cursor keys. The computer beeps when it nears the edge of the page, but carriage return and line-feeds are automatic, so complete words are moved to the next line if they will not fit.

The left-hand side of the screen contains line numbers (up to over 220) so you know how far through the document you are. To assist in centring, symbols appear at each quarter across the page (these numbers do not appear on printing). There is a *Tab* facility and another menu appears when you come to print the text. This gives you the ability to alter line spacing, number of copies, etc.

One useful facility is the opportunity to alter the control codes sent to the printer. Apart from the text, computers send Ascii codes that control line feeds, double height letters, compressed text, etc. The problem is that each make of printer has its own set of codes.

While *Alphabeta* is set up for a Seikosha printer, it is possible to alter the codes to suit almost any make. It works well on an Epson FX80 and also on an OKI Microline (the up market *Wordwise* is not so universal and refused to print in double-spacing on this printer).

In spite of these excellent points, *Alphabeta* can be irritating to use. It is tiring on the eyes to attempt to read large lengths of text, due to the need to move the window from side to side.

It would be nice to be able to see the formatted text in an 80-column mode. This would of course eat up the memory and would render the text almost unreadable on a TV rather than a monitor, and it has to be seen as a budget W-P package. The other irritation is the painfully slow text storage. This is necessary each time a block is stored and inserted elsewhere.

As with most things, you get what you pay for. If you write a lot then *Wordwise* offers many advantages but is expensive. If you want a good, inexpensive system and are prepared to put up with the limitations, then I would have no hesitation in recommending *Alphabeta*.

The BBC microcomputer is reasonably user-friendly, certainly more so than machines like the Vic20. However, it is still a comparatively long process to turn one's ideas into pretty pictures, which is why graphics packages sell well. Using them carefully, it is possible to draw circuit diagrams, opening titles that can be recorded on video cassettes, or demonstration diagrams for text-books or lectures. They also demonstrate the fundamentals of Computer Aided Design.

The three packages readily available have similar features but the prices vary considerably.

Salamander Software is the sole agent for the *EDG Graphics Package*, the most expensive. At £24.95. On loading, the mode can be selected which determines the resolution and the number of colours available. A flashing cross-hairs cursor appears in the middle of the screen which can be moved around using the cursor keys. The speed is determined by the length of time the key is held down, which takes a little getting used to.

There are many options which can be chosen according to the type of drawing required. Luckily the manual is both comprehensive and clearly written, which is essential as there are over 30 options in all! These include drawing arcs, boxes, circles, triangles and dotted or solid lines. The colours of the background and foreground can be changed using the < and > keys and text can be inserted anywhere. The amount of free memory left is shown as a percentage and completed pictures can be saved on cassette or disk.

There is a feature called *rubber-banding* that no self-respecting graphics package should be without. This involves anchoring one end of a line and moving the drawing cursor independently. The distance between the two points is filled with a flashing line, just like a piece of stretched elastic. When the line appears to be in the correct place it can be filled in. If you are not happy with your most recent move the whole display can be erased — each part held in memory can be redrawn up to the offending section.

Artist from The Software House is similar to the EDG package, but is considerably cheaper at £12.50. It has less features, as you would expect, but still manages drawing and filling in various shapes and rubber banding.

Text can be displayed normally or with a dropshadow, which produces a realistic 3-D effect. Joysticks can be used, and areas can be filled in with a selection of 32 paintbrushes made up from user-defined

characters This gives you the ability to achieve pointilist or stippled effects when painting

Grafkey from Clares is the cheapest of the collection at £7 95 (*Grafstik* is identical but designed for use with joysticks) You might imagine that it is therefore lacking in some respect Surprisingly it contains most of the features of the other two as well as some of its own

The first program contains instructions, as well as an explanation of the use of the function keys Options include line mode triangle mode rectangle mode circle mode and text mode and you can fill shapes or simply draw their outlines The resolution mode can be changed during drawing, as can the colours and there is a *rubber-banding* option You can print a grid across the screen as a drawing aid and remove it when no longer necessary

The *EDG* package contains everything you could need in a graphics program but the price puts it in the professional class Although *Grafkey* does not contain as many options as *Artist* or the *EDG* package it is the only program that is within the price range of many people Considering the facilities it is by far the best value

The last section of programs to be considered are databases Because of their ability to sort and display information computers are useful for holding banks of information on any subject that would have previously needed a card index to catalogue The data stored can be as simple as a personal telephone directory or a record of a stamp collection

As an example supposing you had a database of a stamp collection and you wished to find out details on all your stamps from Germany A database program would have no trouble in printing out all these records

A really good database, however could tell you how many stamps you had from Germany that had pictures of people, had a face value of less than 1 mark, and were produced after 1960 Your record would need to contain at least five fields or separate bits of information, about each stamp ie catalogue number country face value description and date It should also be able to sort information into numerical catalogue order date order alphabetical order of picture or country and in order of value If you think that is a lot for a database program then consider that there is a Dragon program that can do most of these things on *Special Selection 2* — it's not the only program on the cassette, and it's less than £10!

For some reason this type of software for the BBC is very expensive and in some cases the software cannot justify the price Bug-Byte produce a program called *Multifile* which allows the setting up of a simple filing system to hold, for instance, club membership records It is well documented, and allows calculations to be made on numbers held in the file This means that if the file contained graded subscriptions as one of the fields and you wished to increase them all to cope with inflation then it would be possible to increase them all by say 5 5 percent The program is menu-driven and easy to use but for a comparatively short program, it is rather over-priced at £15

Gemini Marketing sells a program called *BBC Database Filing System* This contains a setting-up program to define the number and type of fields as well as the main database program and a demonstration file There are 11 options in all adding new records, bytes free, deleting records, search for records that satisfy up to 8 criteria (as in the stamp example earlier), list all or just selected records, modify records, print selected records, save and load to tape or disk sort records based on any field perform calculations on numeric fields or leave program

This is a well-documented, professional program that does almost everything you could expect of a good database Unfortunately it costs £19 95

It is encouraging to see serious software being developed for the BBC micro All the programs mentioned here show a polish that is often lacking in areas such as games and education But if they are to gain wider acceptance software houses need to be careful not to price themselves out of the market ■

Firm	Program	Price
Acorn dealers	*View*	£59 80 (Rom)
Computer Concepts 16 Wayside Chipperfield Herts WD4 9JJ	*Wordwise*	£46 00 (Rom)
H & H Software 53 Holloway Runcorn Cheshire	*Alphabeta*	£14 50 (tape)
Salamander Software 27 Ditchling Rise Brighton Sussex	*EDG Graphics Package*	£24 95 (tape)
The Software House 146 Oxford St London W1	*Artist*	£12 50 (tape)
Clares Providence House 222 Townfields Rd Winsford Cheshire	*Grafkey*	£7 95 (tape)
Bug-Byte 100 The Albany Old Hall St Liverpool L3 9EP	*BBC Multifile*	£15 00 (tape)
Gemini Marketing 9 Salterton Rd Exmouth Devon EX8 2BR	*BBC Database Filing System*	£19 95 (tape)

Of mice and men

***John Scriven** presents a brief history of electronic mice*

Time magazine has christened 1983 the year of the mouse. This amazing announcement has nothing to do with Donald Duck's buddy, nor has it caused the more timorous to leap for their stools. The reason is that this small rodent is, like its cousin the turtle, an electronic beast.

A computer mouse is a hand-controlled peripheral device that is moved along the surface of a desk. As it moves, its graphic equivalent, a little screen mouse, moves across the surface of the screen display. Instead of eyes, it has up to three buttons on its "face", while its "tail" is the connecting cable to the micro. In real terms, it combines the functions of a light pen and a joystick and enables the operator, one-handed, to move the screen mouse around the display. When it is opposite the selected option on a menu, for instance, its eye button is pressed and the menu option carried out.

Although, as yet, a rare breed in this country, there is no doubt that mice will become more popular over the next few months. When Apple's expensive new Lisa computer is released officially, it will be the first mouse that we are likely to see, although at $6,000 plus it will probably not be peeking its nose out of any but the most up-market offices. Other systems that use a mouse as the standard means of communication are the Xerox Star and Visicorp's Visi-On.

The Apple Lisa with mouse

It is not these machines that will make mice multiply in this country, however. The reason why their popularity will grow is that they are becoming available in the United States as accessories for more mundane computers (well, slightly more mundane!) like the Apple II and the IBM personal computer. Later on this year, when the low-price Apple Macintosh micro is revealed, it promises to be a mouse-driven machine.

Although only just edging their way from under the skirting board, mice have been with us for a considerable time. Invented by Douglas Engelbart at the Stanford Research Institute in 1964, they are about as old as Basic itself.

The first mouse was a simple box running on two wheels placed at right-angles to each other. When the mouse was rolled forward, one wheel rotated while the other one skidded on the desk and did not turn. If the mouse was pushed diagonally, the wheels moved proportionally to the distance pushed. Two potentiometers translated the rotation of the wheels to a voltage that was sent to the computer. Analogue/digital convertors were comparatively expensive in those days and the tracking system soon wore out.

In 1972 the Xerox corporation went to an independent inventor, Jack Hawley, in Berkeley, California, with a request to update their mouse. He produced a first version that ran on a single large ball-bearing. Apart from its smoother and long-lasting action (it sounds like a Gillette advert!), the rotating ball now sent digital signals, ie, electrical pulses, to the computer that could be read directly, without the need for a digital/analogue convertor. This is one of the types still used by Xerox, although recently they have moved over to an optical model.

Optical mice use the latest technology so that moving parts are no longer necessary. As the mouse moves over an array of dots on a special pad, a small bulb reflects an image onto an IC sensor chip. As the inventor, Steve Kirsch, of Mouse Systems Corporation, is reported to have said: "Yes folks, it's all done with mirrors!"

Although a distant relative of the simple photo-cell, the specialist sensor chip recognises the pattern at the start and compares it with the new pattern reflected as the mouse moves. In this way, both distance and direction can be digitised and fed to the host computer.

Some recent mice, including one made in Switzerland by the Depraz Corporation, incorporate a mechanical motion sensor but then decode this information digitally. The very latest ones incorporate transmitters and do not need 'tails' (Manx mice?!); they also continue to operate when lifted from the surface by a few centimetres.

You may wonder why so much fuss is being made over such a small peripheral device. It has been discovered that top executives do not like using computer keyboards. The reason, apparently, is that they associate the keyboard with menial labour normally carried out by the lower orders (ie, secretaries from the typing pool!) and find the action of typing demeaning. By using mice in conjunction with an advanced language like *Smalltalk*, the executive does not feel he is using something that is beneath him.

Apple's Lisa uses this system of complex graphics with icons or little pictures on the screen instead of words. For instance, instead of typing in 'delete last file', you move the mouse across over the tiny screen waste-paper basket and simply press the button. Apparently this fear of micros does not extend to such a degree to British executives and they are not afraid to "dirty their hands".

If you have an Apple or an IBM PC, then the present price of mice may not be important to you — the cheapest mouse for either machine costs $149 plus $100 for the interface (from Product Associates Inc of Redwood City, California). At this price, about £160, there will be few people owning machines like Dragons willing to spend the price of their micro again on such a small device. The prices of American and Swiss mice are bound to drop considerably as volume sales are reached; a Texas firm is planning to sell a mouse for the IBM PC for $100 later this year, complete with software.

What is also likely is that some enterprising developer in this country will produce a British mouse for £20, which is all a mechanical analogue mouse should cost. If you have a micro with built-in analogue interface, like the BBC, you could be squeaking in a few months from now! ■

Bombs away!

__Luc Fountain__ uses a City Bomber Program to show off the Oric s graphics

It can be difficult for the computer novice to understand how it is possible to create shapes on the machine which look like proper objects In this article I hope to show how it can be done on the Oric

The computer doesn t really move shapes around the screen it just draws the requested image on the screen at the place — the screen address — you designate Then it does it again at the next screen address and so on Thus the impression of movement is created

The program that accompanies this article *City Bomb* is designed to exploit the advantages of Oric Basic Although the images on the screen are quite effective the graphics are extremely simple — two objects move and a collection of skyscrapers get zapped

The 55 lines of the program can be divided into three sections creating realistic shapes manipulating the moving parts, and achieving the appearance of destruction either of the skyscrapers or the pilot

To understand how to create shapes it is necessary to understand the user-definable graphics facility

Let s start with the main shapes In *City Bomb* there are six shapes four of which form an aircraft that resembles a World War Two Typhoon The fifth shape is the bomb that emerges from the plane s fuselage The sixth is the shape of each unit of the skyscraper blocks the skyscrapers are just vertical lines of varying numbers of blocks randomly distributed to give the impression of a city skyline

Figure One

128 64 32 16 8 4 2 1

0 1 2 3 4 5 6 7

Designing the bomb on an 8 × 8 grid

Look at Figure 1 the grid which was used to draw the shape of the bomb The bomb represents at any point in the program one byte and this is divided into the eight bits (the binary digits) that form the byte by the horizontal columns numbered 0 to 7 The eight numbers on the top of the grid give the values of each bit 128 64 32,16 8 4 2 and 1 The shape of the bomb is first designed by shading in the appropriate squares and then totting up the values of each line For example the values of line 7 is 8+4 = 12 while line 0 adds up to 63 (32 + 16 + 8 + 4 + 2 + 1)

Now the connection with user-definable graphics What you are going to do is change one of the characters in the Ascii list The one chosen has the decimal code 123 and normally figures in the Oric alphabet as { It is a character that won't normally appear in any ordinary text

Having decided that you can do without this one you alter it by using the *Poke* command This is the formula — multiply the Ascii decimal code by eight 123 × 8 = 984 Add 46080 This gives you 47064 Now plant your eight bits into the address that was the character string 123

```
FOR A - 47064 TO 47071 READB POKEA,B NEXT
DATA 63 63 30 30 30 30 12 12
```

The eight bits you have been handling have the designation 47064 to 47071 The

continued on page 21

```
2 T=48085
3 D=123
4 PRINT CHR$(6);CHR$(17)
5 PAPER0:INK7
10 FORA=47064 TO47071:READ B:POKEA,B:NEXT
20 DATA63,63,30,30,30,30,12,12
30 FORA=46808 TOA+7:READB:POKEA,B:NEXT
40 DATA32,48,56,60,63,63,63,63
50 FORA=46816 TOA+7:READB:POKEA,B:NEXT
60 DATA0,0,31,32,127,255,0,255
70 FORA=46824 TOA+7:READB:POKEA,B:NEXT
80 DATA0,0,128,241,249,255,249,241
90 FORB=A+8TOB+7:READC:POKEB,C:NEXT
100 DATA0,0,0,255,255,255,0,255
110 FORA=B+8TOA+7:READC:POKEA,C:NEXT
120 DATA63,43,63,53,63,43,63,63
122 GOSUB5000
125 CLS
127 W=48772 :FOR P=W TO 49332 STEP40:POKEP,97:POKEP+1,
    97:POKEP+2,97
130 POKEP+10,97:POKEP+11,97:POKEP+12,97:POKEP+13,97
140 NEXT
150 W=48500 :FOR P=W TO 49180 STEP40:POKEP-1,97:POKEP-2,97:
    POKEP-3,97:POKEP-4,97
160 POKE P+15,97:POKEP+14,97:POKEP+13,97:POKEP+12,97:
    POKEP-19,97:POKEP-18,97
161 NEXT:W=48588 :FOR P=W TO49268STEP 40:POKEP,97:POKEP-1,97
162 POKEP-20,97:POKEP-21,97:POKEP-22,97
170 NEXT
180 W=48694 :FORP=WTOW+480STEP40:POKEP-1,97:POKEP-4,97:NEXT
210 FORX=0TO10:5
230 T=T+1
235 POKET-1,32
300 POKET,91:POKET+1,92:POKET+2,95:POKET+3,93
310 I=PEEK(T+4) IFI=97 THEN EXPLODE GOTO 1000
320 IF KEY$>CHR$(R) THEN LL=20:POKE R,32:R=T+40
330 IFLL=20 THENR=R+40: POKE R,D POKER-40,32
340 IFR>5000 THEN R=R
400 NEXT
500 PRINT CHR$(12)
507 PRINT
510 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT.
    PRINT SPC(10);CHR$(4);CHR$(27);"N GOOD LANDING":WAIT 200
515 PRINT CHR$(4)
520 PRINT CHR$(12):GOTO1001
1000 PRINT CHR$(12);PAPER1:INK6:WAIT5:PAPER0
1001 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
1002 PRINT:PRINT:PRINT:PRINT
1020 PRINT CHR$(4);CHR$(27);"N             GAME OVER"
1030 PRINT CHR$(4)
1040 PRINT:PRINT:PRINT"Any key for another go.".GET R$:PRINT
     CHR$(6):RUN
5000 CLS
5005 FOR N=48248  TO 48270 :POKEN,91:POKE N+1,92:POKEN+2,
     95:POKE N+3,93:POKE N-1,32
5020 NEXT
5025 PLOT5,5,"CITY BOMB BY L.FOUNTAIN"
5030 FOR N=48611  TO N+20:POKE N,91:POKEN+1,92:POKE N+2,95:
     POKE N+3,93:POKEN-1,32
5040 NEXT
5045 PLOT5,14,"SPACE BAR TO FIRE BOMB".WAIT200:CLS:
     RETURN
```



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Read command leads to the *Data* statement where you give the values you reached by totting up the aggregates of lines 0 to 7 in Fig 1 In the listing the bomb comes at lines 10 and 20

The same process on a larger scale applies to the shaping of the aircraft and also the standard character for the buildings in lines 30 to 120 The *Data* statements have to be worked out carefully and a supply of graph paper will help

The decimal codes Ascii for the plane were chosen to be 91 92 95 and 93 These emerge when you evaluate the *Data* statements at the start and they also show up in the subroutine from line 5000 which provides the opening sequence in which the plane skims across the screen or to put it more accurately is *Poked* to a series of screen addresses At the same time the instructions ' Space bar to fire bomb appear

So much for the sub-routine Back to *Cls* at line 125 Now comes the task of sketching in the city skyline for which the *Poked* character has the decimal code Ascii of 97 Look at lines 127 and 130 the figure 48772 represents the screen address at which the skyscraper character is first drawn The *Step* 40 command then whisks the character the full width of the screen and plants it again immediately underneath and so on to the lowest visible point the appearance of vertical piles giving a strong impression of a city skyline The same process of construction continues up to line 180 Line 210 signals the opening of the main loop the progress of the aircraft across all the screen addresses available from close to the top of the screen to the middle of the bottom line

The variable for this purpose was set out in line 2 T = 48085 That figure is the screen address at which our intrepid aviator makes his appearance high over the doomed city His progress to each ensuing address is through the *For/next* sequence in which *X* in line 210 serves to identify the 1015 available points on the screen after 48085

But you ask the character is *Poked* to a screen address and then another and another Why doesn t screen simply fill up with endless wall-to-wall aircraft? Well of course it would, without line 235 in which the computer looks at the space last occupied and plants, or *Pokes* into that address the character which has the code 32 and is actually a blank

The same problem of blotting out the last image also occurs with the falling bomb It is dealt with in lines 320 to 340 For another example of the principle this embodies see the following program

```
10 PAPER 4 INK 6
20 CLS
30 FOR B   48050 TO 48130 STEP 40
40 POKE B  40 32 POKE B - 39 32
50 POKE B 128 POKE B + 1 128
65 NEXT
70 GOTO 30
```

Remember as you see in line 30 that the command *Step* 40 has the effect of repeating the image immediately below the point it appeared last there being 40 character spaces across the screen width

What happens in this short program is that two cursors appear to move vertically downwards with the useful Ascii 32 the blank space following along behind

Now we see how the shapes are created and how they move But how does the computer know what is happening? This is where the *Peeking* starts Line 310 says

```
I  Peek (T + 4)  IF I - 97
```

and so on What happens is that the process of *Peeking* — looking at an address — tells the computer what is happening there And, of course, if part of an aeroplane or a bomb, are at the same address as part of a skyscraper, then the *Explode* command is activated

One final point It will be noted that the *Poke* command has been extensively used where *Plot* might have been preferred The trouble with *Plot* is that it deals only with characters not numbers so establishing when one character was about to collide with another would be harder Before the plane hits a building I *Peeked* the address in front so if the value is no longer 32 our old friend the blank space then the plane has hit something ■

Entered and run

Ian Logan explains how programs are executed in the third of a five-part series

The Spectrum together with the majority of other microcomputers on the market has an operating system that enables the user to *Enter* and Run Basic programs

A Basic program consists of a set of lines each of which normally has one or more statements The essential part of Running a program is to consider each statement in the order determined by the programmer

In the Spectrum Basic lines written with line numbers are stored in order in the program area The use of the line numbers is restricted at this stage to providing the user with an easy manner of identifying a line that is to be edited

The user executes a program by entering a direct Basic line Such a line is constructed in the edit-line buffer and is indicated as being direct by the user omitting to give any line number The direct line may have one or more statements but the more usual forms are

RUN — which means execute the program from line 0
GO TO n — when execution is to begin at line n

Once the syntax of the direct line has been checked and accepted a call is made to the subroutine *Line-run* at address *7050 (1B8Ah* and called *Execute* by Sinclair Research) In this subroutine the direct line is given the number −2 and this number is stored in the system variable *Ppc* to show that the present line being interpreted is indeed line −2

A loop is now entered to handle the lines of the program in turn As each new line is considered then the base address of the following line is entered into the system variable *Nxtlin* When handling the direct line the value in *Nxtlin* is the address of the end-marker at the end of the edit-line buffer — for the program line that is the last line of a program *Nxtlin* will address the end-marker of the program area.

The lines of the program are considered to follow each other and this is the order taken unless the programmer has determined that the order is to be changed as with Run *Goto* etc

Next an inner loop is entered to deal with the statements within a line Each statement is considered in its entirety — whilst it is being handled the system variable *Ppc* holds the line number and the system variable *Subppc* holds the statement number

At the end of the routines concerned with any statement the *Break* key is scanned and a report given if the user is pressing the *Break* key The following statement to be handled is then identified It will be

- The next statement in the line if such a statement exists and there is not a jump to be made
- The first statement of the next line if there are no further statements in the present line — the next line being found by reference to *Nxtlin*
- A jump is to occur The correct address for *Nxtlin* is found by performing a search of the program area for the starting address of the required line

This last instance — when there is to be a jump — is of interest Statements with Basic commands Run *Goto Gosub*, *Return* and *Next* (when being actioned) all use jumps In the Spectrum, the destination of the jump is described as a line number and a statement number The searching of the program area is then performed from its start

This whole operation is very time consuming as can be seen when performing a *For – Next* loop which is embarrassingly slow on the Spectrum It would be much quicker if the destination of a jump were an address but this is not really possible with the dynamic areas of the Spectrum

The only way of exiting from the *Line-run* subroutine is through the error handling routine If an error is found whilst handling a statement then it is a true run-time error If the *Break* key is found depressed at the end of handling a statement then the report *Break into program* is given Finally if the system variable *Nxtlin* addresses an end-marker then the report *OK* is given In this last case the *OK* is handled as the error although often no error has occurred

The reason for the system being designed in this manner is that the error handling routine clears all the stacks, buffers and work spaces and this has to be done before returning from *Line run*

Actual statements are all handled in the following manner

1) First the command word of the statement is fetched
2) The system variable *Ch add* is advanced to point to the following character
3) A loop is entered to fetch the entries in the parameter table in turn These will be command class codes or ASCII separator codes The appropriate subroutines are called
4) If necessary the address of a command routine is fetched from the table and a jump made to the routine

In all cases there is a return made to *Stmt-ret* at address *7030 (1B76h* and called *Endstt* by Sinclair Research) In this routine the first action is to scan for the *Break* key

The above steps are most easily understood by considering some of the more straightforward Basic statements Possibly the simplest statement to take first is the statement — *Cls*

Step 1) The command is *CLS* — clear the tv screen
Step 2) The system variable pointer is set to address the carriage return or character
Step 3) The first entry for *CLS* is fetched from the parameter table The entry is 0 (address 6845 1ABEh) Therefore the routine Class 00 is followed (address *7184 1C10h*) Commands of class are commands without operands (viz *Cont Copy* etc) so step 4 is considered directly
Step 4) The address of the *CLS* command routine is taken from the parameter table — address 3438 (0D6Bh) and a jump made to the routine The screen is thereby cleared

If the statement was being considered in syntax-time, then step 4 would not have been followed The return after step 3 ends the syntax checking path

As an example of a command that requires a pair of numeric operands consider the statement — *Poke m n*

Step 1) The command is *Poke* — enter the byte *n* into the location with address *m*
Step 2) Advance the system variable *CH add* to address the first character of *m*
Step 3) The first entry in the parameter for *Poke* is the value 8 Therefore the routine *Class-08* at address 7290 (1C7Ah) is to be followed This routine is now given

```
CLASS-08    CALL 1C82h
              EXPT-1NUM       evaluate m
            CP +2C            a comma?
            JR NZ, REPORT-C   error if not
            RST 0020h
              NEXT-CHAR       advance CH_ADD
EXPT-1NUM   CALL 24FBh
              SCANNING        first m then n
            BIT 6 (FLAGS)     numeric or string?
            RET NZ            return if numeric
REPORT-C    RST 0008 ERROR-1
            DEFB 0Bh          give nonsense in
                                BASIC
```

In the routine the call to *SCANNING* leads to the evaluating of the present expression and the storing the result on the calculator stack The expressions are to be separated by a comma so this has to be checked The call to *NEXT-CHAR* advances *CH ADD* past the comma The testing of bit 6 of the system variable *FLAGS* ensures that only numeric values are accepted

Step 4) The address of the *POKE* command routine is taken from the parameter table and the subroutine is called (address *7808 1E80h*) This subroutine consists of the three lines

```
CALL 1E85h
  TWO-PARAM         a subroutine that puts n
                    into the A register and
                    m into the BC register pair
LD (BC),A           the actual POKE operation
RET
```

and performs all that is necessary to complete the handling of the *POKE* statement

To the machine code programmer trying to extend the Basic command set of the Spectrum the most useful subroutines in the 'old' Rom are detailed in the table shown last week

In the last article the syntax-module for the command — *Cls #* — was discussed Now, the corresponding run time module can be given

```
LD HL 3838h          Black INK & white PAPER
LD (ATTR P) hl       Set the permanent system
                     variables
LD (ATTR T) hl       and the temporary ones
LD (BORDCR) 1        Set BORDCR also
LD (P FLAG) h        Clear P FLAG
LD A,07h
OUT (FEh) A          Border to go white now
CALL 0D6Bh CLS       Clear the screen
     exit
```

This short routine can be used on the basic Spectrum (called via a *Usr* command) but it is so much more useful when it can be called directly from Basic

Next week we shall look at the expression evaluator ■

Stored and dumped from memory

***Gordon McQueen** explains how images can be stored in memory and dumped on the graphics screen*

This program runs in 32K It uses 16K to store graphic images, each of size 1536 bytes ie one graphics page The main program is contained in lines 10 to 160 and 1000 to 1110 The extra lines contain an example display

The program uses two machine code routines one to get the display from the screen and store it in memory and the other to do the reverse ie get the display from memory and dump it on to the graphics screen

The machine code routines get an address stored at location 32766 decimal — this is the location at which the contents of the graphic screen will be stored at or loaded from This is why a *For Next* loop is used to input individual displays and to output the displays

The routine used to store a graphics page into memory is executed from 7d76 hex and the routine used to display a graphics page from memory is executed from 7d64 hex ■

```
0 REM ANIMATION
1 REM BY GORDON MCQUEEN
2 REM FOR THE DRAGON 32 OR
3 REM 32K TANDY COLOUR COMPUTER
10 DATA  190, 127, 254, 16, 142, 6, 0, 166, 128
20 DATA  167, 160, 16, 140, 12, 0, 38, 246, 57, 190
30 DATA  127, 254, 16, 142, 6, 0, 166, 160, 167, 128
40 DATA  16, 140, 12, 0, 38, 246, 57
50 FOR 1=&N7D64 TO &N7D87
60 READ A
70 POKE I,A
80 NEXT I
90 CLEAR 1000,32000
100 PMODE3,1
110 PCLS
120 SCREEN1,0
130 D=2
140 FOR XX=16384 TO 29000 STEP 1536
150 POKE 32766,XX/256
160 POKE32767,0
170 REM GRAPHICS DISPLAY NERE
180 FOR X=0 TO 255 STEP D*2
190 LINE(X,0)-(255-X,47),PSET
200 NEXT X
210 FOR Y=0 TO 47 STEP D
220 LINE(0,Y)-(255,47-Y),PSET
230 NEXT Y
240 EXEC&N7D76
250 D=D+2
260 PCLS
270 NEXT XX
1000 REM PROGRAM TO DISPLAY GRAPHICS
1010 FOR XX=16384 TO 28672 STEP 1536
1020 POKE 32766,XX/256
1030 POKE 32767,0
1040 EXEC &N7D64
1050 NEXT XX
1060 FOR XX=28672 TO 16384 STEP -1536
1070 POKE 32766.XX/256
1080 POKE 32767,0
1090 EXEC&H7D64
1100 NEXT XX
1110 GOTO 1000
```



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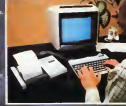
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Tunnel vision...

***Boris Allan** opens a window on tunnel graphics and the use of actual colours*

There are many interesting facets to graphics on the BBC computer — one of the most interesting (but strangely under-used) is the concept of logical versus actual colours

Another facet — also under-used — is the use of the graphics window for drawing rectangles It is quicker to draw a rectangle by setting a graphics window and clearing the background to the appropriate colour than it is to draw the rectangle by two triangles

Start with the drawing of rectangles to draw a rectangle with co-ordinates *X1 Y1 X2 Y2* we set up a graphics window by use of a *Vdu 24* command (User Manual, page 58)

VDU 24 X1 Y1 X2 Y2

The difference between the comma (twixt *24* and *X1*) and the semicolons is crucial The comma instructs the system to send the preceding number as one byte (so that the number has to be within −255 to 255) The semicolon sends the preceding number as two bytes (normally limits of −32768 to 32767) As the co-ordinates lie between zero and 1279 or 1023 they must be sent as two bytes (being greater than 255) and this is true of any *Vdu* command which sends high resolution co-ordinates to the system

To set the rectangle to a colour *C* we use the *Gcol* command but have to add on 128 as we are using the background colour (see page 168 of the User Manual)

GCOL 0 C+128

This is a speedy way to draw a rectangle of colour *C* (ie logical colour *C*, which usually is the same as the actual colour)

The alternative way of drawing a rectangle is to treat the rectangle as being composed of two triangles and to use the *Plot 85 X Y* command (see page 320 of the User Manual) For the same co-ordinates as before we move to a point without plotting by

PLOT 4 X1 Y1

and then draw a line

PLOT 5 X1 Y2

which is turned into a triangle by the plotting moving to another apex

PLOT 85 X2 Y1

Having drawn one triangle we continue to draw the next triangle by one more command

PLOT 85 X2 Y2

and this completes our rectangle

Suppose we have a background of colour 129 (the actual colour number for red) and wish to change the colour to blue There are two ways to proceed we can clear the background to the new colour by *Gcol* and clearing the graphics window or we can change the logical colour 129 to the actual colour number 132 by

VDU 19 129 132 0 0 0

(User Manual page 169) The second of the two methods is far simpler

To illustrate these methods I have developed an application I call *Tunnel Graphics* The idea behind *Tunnel Graphics* is that we have a succession of borders of varying colours and the colours change seeming to advance towards the middle there are 16 different converging borders The colours are changed by altering the assignment to logical colours

Consider the first program (the window version) which uses the graphics window to draw rectangles and logical assignments to change colours The program is designed to operate in mode 2 (though it will operate in other modes) and uses a byte vector *N* to store 16 values which correspond to the logical numbers *A$* holds the result of an *Inkey$* later in the program

Line 1160 shows that successive elements of *N* hold successive values from 0 to 7 The graphics colour *I%* is then assigned to the background colour by *Procgcol* and by use of *Procsetquad* a rectangle is drawn successively becoming smaller Line 1200 resets the graphics window to the full screen

From 1210 to 1260 there is an indefinite loop terminated by depressing the *F* key which decrements (line 1230) the actual colour (modulo 8) for each band and then assigns the new logical colour (line 1240)

The first procedure *Procgcol* sets the logical colour for the background (which explains the +128 in line 1310) The second procedure sets up successively smaller graphics screens (in line 1340), then clears the graphics window

In the second program (the triangle version) the only changes are to the procedures this shows the flexibility of BBC Basic The main differences in the procedures are that in *Procgcol* the foreground colour is set and *Procsetquad* uses triangles to draw the shapes

It is worth timing the programs I time the creation of the borders/tunnel effect by the first program as taking about four seconds the other program takes about five-and-a-half seconds — the difference is such that it makes sense for applications which fit, to use graphics windows where possible It makes even more sense to use actual colours and vary them rather than manipulating logical colours ■

```
1000REM--------------------------------
1010
1020 *
1030 REM TUNNEL GRAPHICS
1040
1050 REM WINDOW VERSION
1060
1070
1080 REM (c) BORIS ALLAN, 1983
1090
1100
1110
1120REM--------------------------------
1130 MODE 2
1140 DIM N 15, A$(1)
1150 FOR I%=0 TO 15
1160 N?I%=I% MOD 8
1170 PROCGCOL(I%)
1180 PROCSETQUAD(I%)
1190 NEXT I%
1200 VDU 24,0;0;1279;1023;
1210 REPEAT
1220 FOR I%=0 TO 15
1230 N?I% = (7 + N?I%) MOD 8
1240 VDU 19,I%,N?I%,0,0,0
1250 NEXT I%
1260 A$=INKEY$(0)
1270 *FX15,1
1280 UNTIL A$="F"
1290 END
1300 DEF PROCGCOL(J%)
1310 GCOL 0,(J% MOD 8)+128
1320 ENDPROC : REM GCOL
1330 DEF PROCSETQUAD(J%)
1340 VDU 24,J%*40;J%*32;1279-J%*40;1023-J%*32;
1350 CLG
1360 ENDPROC : REM SETQUAD
```

```
1000REM--------------------------------
1010
1020
1030 REM TUNNEL GRAPHICS
1040
1050 REM TRIANGLE VERSION
1060
1070
1080 REM (c) BORIS ALLAN, 1983
1090
1100
1110
1120REM--------------------------------
1130 MODE 2
1140 DIM N 15, A$(1)
1150 FOR I%=0 TO 15
1160 N?I%=I% MOD 8
1170 PROCGCOL(I%)
1180 PROCSETQUAD(I%)
1190 NEXT I%
1200 VDU 24,0;0;1279;1023;
1210 REPEAT
1220 FOR I%=0 TO 15
1230 N?I% = (7 + N?I%) MOD 8
1240 VDU 19,I%,N?I%,0,0,0
1250 NEXT I%
1260 A$=INKEY$(0)
1270 *FX15,1
1280 UNTIL A$="F"
1290 END
1300 DEF PROCGCOL(J%)
1310 GCOL 0, J% MOD 8
1320 ENDPROC : REM GCOL
1330 DEF PROCSETQUAD(J%)
1340 PLOT 4,J%*40,J%*32
1350 PLOT 4,J%*40,1023-J%*32
1360 PLOT 85,1279-J%*40,J%*32
1370 PLOT 85,1279-J%*40,1023-J%*32
1380 ENDPROC : REM SETQUAD
```



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Maths

on Vic20

This is a maths test for the Vic20. It can run on an unexpanded Vic. The idea of this program is to test a person's ability on answering questions on Maths.

Program notes

1	Clears the screen and sets how many questions there are
15	Sets the variable B at 0
20 21	Read the question and answer from the data
22	Sets the variable T to 1 and allows you to have three goes and prints the question each time
30	Waits for you to input an answer
35-70	Decide whether the answer is correct
75	Goes back to the variable T
150	Clears the screen
151 152	Decide if B equals one then adds one to the score. If B doesn't equal one then prints the answer and then pauses
200	Prints the score
201	Goes to line 20 and reads the question from the data
202 230	Is the data
240 245	Asks you if you want another go
250	Waits for you to input Y or N or Yes or No
251 252	If what you input equals Y then run the program again and if what you input equals N then print Coward
253	If A$ doesn't equal Y or N then it goes back to the previous word and allows you to reprint over it
403	If the answer that you inputted at the beginning of the program is wrong then it prints No and pauses and then prints the score and then returns to the normal pattern

```
0 REM MATHS TEST,BY SHAHIDA AHMED,1982
1 PRINT"J" FORY=1TO10
15 B=0
20 READ I$
21 READ N$
22 FORT=1TO3 PRINT I$
30 INPUT A$
35 IF A$=N$THEN T=3 B=1
70 IF A$<>N$THEN GOSUB 403
75 NEXTT
150 PRINT"J"
151 IF B=1 THEN A=A+1
152 IF B<>1 THEN PRINT" THE ANSWER IS "N$ FORI=1TO3000 NEXT
200 PRINT"J"A"OUT OF"Y
201 NEXTY
202 DATA"WHAT IS THE ANSWER TO 13+17+30/20","3"
203 DATA"WHAT IS THE ANSWER TO 12+15+3/3","10"
204 DATA"WHAT IS THE SQUARE ROOT OF 64", 8"
205 DATA"WHAT IS 32 TO THE POWER OF 2","5"
210 DATA"IF A TRAIN TRAVELS AT 50KM/H HOW LONG WILL IT TAKE TO TRAVEL 200KM","4"
211 DATA"WHAT IS THE AREA OF A BOX 20CM WIDE AND 30CM LONG","600"
212 DATA WHAT IS THE VOLUME OF A CUBE 3CM WIDE,7CM LONG AND 4CM HIGH","84"
215 DATA"WHAT IS 30%OF £30.00","9"
220 DATA"HOW MANY EGREES ARE THERE IN A RIGHT ANGLE", 90
230 DATA"HOW MANY DEGREES ARE THERE IN A FULL TURN" "360
240 PRINT"DO YOU WANT ANOTHER GO"
245 PRINT"IF SO THEN PRESS Y IF NOT THEN PRESS N"
250 INPUT A$
251 IF LEFT$(A$ 1)="Y"THEN RUN
252 IF LEFT$(A$,1)="N"THEN PRINT"[illegible]" PRINT"COWARD! PRINT [illegible] END
253 PRINT"TJ" GO TO 250
403 PRINT PRINT"NO" FORH=1TO700 NEXT PRINT"[illegible]A"OUT OF"Y RETURN
```

Maths
by Shahida Ahmed

Cruiser

on BBC

This program will run on the BBC model B. Although written in Basic a fair speed is obtained by the simplicity of the program.

It should be fairly easy to convert it to other BBCs. Controls are the left and right cursor keys. The object of the game is to pilot your space craft through the obstacles, points being scored by the distance travelled. The game becomes progressively harder.

```
  2 ADV=1
  5 S=0
 10 *FX4,1
 20 MODE 4
 30 X=12
 40 VDU 23,244,255,255,255,255,255,255,255,255
 45 VDU 23,235,127,63,31,31,63,63,63,127
 50 VDU 23,224,62,28,34,62,42,42,28,8
 55 VDU 23,236,240,248,252,248,252,252,248,240
 60 VDU 23,245,60,126,255,255,255,255,126,60
 75 F$="tttttttttttttttttttt
   tttttttttttttttttt"
 80 DIMA$(21)
 90 B$="      u    u
100 FOR R=1 TO 250
105 S=S+1
110 IF R=25 OR R=150   B$="  u   u    "
120 IF R=150B$=  u    u  u  u    u
130 IF R=175 B$=     u   u
140 IF R=200 B$=
150 FOR F=1 TO 20:A$(F)=A$(F+1):NEXT
155 PRINTTAB(X,10)" "
160 X$=INKEY$(0)
170 IF X$=CHR$(137) X=X+1
```

```
180 IF X$=CHR$(136) X=X-1
185*FX15,0
190 PRINTTAB(X,11)
195 IF MID$(A$(11),X+1,1)= " " OR MID$
    (A$(1),X+1,1)= " " PRINTTAB(X,11) " :PRINT
    "CRASH":S:SOUND0
, 1F,29,7:SOUND1, 15,100,2:FOR F=1 TO 100:
    NEXT:PRINTTAB(X,11);MID$(A$(1),X+1,1):FOR
    F=1 TO 5000:
NEXT,A$=GET$:RUN
200 D=RND(12)
210 A$(21)=LEFT$(F$,D)+LEFT$(B$,LENB$-2*D)
    +RIGHT$(F$,D)
220 PRINTTAB(0,21);A$(21)
230NEXTR
232 IF ADV 1:GOTO245
235 VDU 23,245,8,60,126,255,252,56,24,16
237 ADV=ADV+1
240 GOTO 90
245 IF ADV>2:GOTO275
250 VDU 23,245,16,56,84,238,84,16,16,16
260 ADV=ADV+1
270 GOTO90
275 IF ADV>3:GOTO295
280 VDU 23,245,24,90,165,165,165,153,66,60
285 ADV=ADV+1
290 GOTO90
295 IF ADV>4:GOTO325
300 VDU 23,245,0,0,8,28,107,62,20,0
310 ADV=ADV+1
320 GOTO90
325 IF ADV>5:GOTO365
330 VDU 23,245,16,16,56,124,254,84,16,56
340 ADV=ADV+1
350 GOTO90
365 IF ADV>6:GOTO395
370 VDU 23,245,60,66,129,129,129,129,66,60
380 ADV=ADV+1
390 GOTO90
395 VDU 23,245,126,126,102,102,102,102,126,126
400 ADV=1
410 GOTO90
```

Cruiser
by Gareth Jones

Scroll

on Lynx

This program demonstrates that scrolling is possible on the Lynx. Ports 12 and 13 of the VDU controller together control the position of the origin of the display on the screen. By changing the values of these ports using the out command in Basic or an equivalent machine code instruction will move the origin about the screen.

The smallest vertical move is 4 pixels corresponding to a change in the value in the ports of 32 or &20. Multiples of 32 cause vertical movement of the origin; other values cause horizontal moves as well.

A character on the Lynx is 10 pixels high and this program scrolls by 8 pixels and 12 pixels alternatively.

The machine code routine is stored in line 100 and the data in line 110. After running the program the screen can be cleared and reset and the data reinitialised using *ProcC*.

Two other tricks were used: normally there is a border of 8 pixels at the top and bottom of the screen which is not used by print. The print @ statement prevents a 16 pixel gap in the scrolled output. There is a bug in the mod function which gives 3 mod 8 as 2: the +0.1 fixes it.

```
100 CODE E5 DD E1 DD 6E 00 DD 66 01 DD
5E 02 16 00 0E 87 3E 07 19 A4 67 DD 75
00 DD 74 01 3E 0D D3 86 3D ED 69 D3 86
ED 61 CB 6B 28 04 CB AB 18 02 CB EB DD
73 02
110 CODE 20 00 40
120 DIM A$(7)(7)
130 A$(0)=""
140 FOR I=1 TO 7
150    READ A$(I)
160 NEXT I
170 DATA WHO,SAYS,THAT,THE,LYNX,CAN'T,SCROLL?
180 PROTECT 0
190 CLS
200 FOR N=0 TO 72
210    INK (N MOD 7)+1
220    CALL LCTN(100),LCTN(110)
230    PRINT @ 3,N*10;N;A$((N+0.1)MOD 8)
240 NEXT N
250 END
260 DEFPROC C
270 OUT &86,12
280 OUT &87,0
290 OUT &86,13
300 OUT &87,0
310 DPOKE LCTN(110),&0020
320 POKE LCTN(110)+2,&40
330 CLS
340 ENDPROC
```

Scroll
by Kym Wilson

Spacs Wsaps

on Spectrum

In this game written for a 16K Spectrum you are the pilot of a galactic fighter searching for the breeding ground of the space wasps that are threatening to colonise your planet.

Initially the screen will show a scan of the whole Universe. The flashing square can be moved to pick a sector you may wish to investigate (press fire to travel into that sector).

Once in a sector occupied by space wasps the screen of your ship will show a sight and an indicator of the wasps position in that sector (the two white dots must be positioned over the red sections of the lines for the wasp to appear on the screen eg if the dots are toward the R and D then you must move right and down by pressing the 8 and 6 keys together). You must have the wasp in the sight to kill it. The wasp will try to avoid you as it is unarmed but you can move faster than them.

When all the wasps in the sector have been destroyed you may land on a planet (if there are any in that sector) to refuel. The planet will be destroyed on take off. If you run out of fuel you will die and the machine will play you a death march.

The breeding ground is always hidden from view and cannot be found until all the wasps in that sector are dead. Your on-board computer will automatically destroy the hive and then display your score.

Controls

←5	8→
↓6	7↑
↙5+6	+8↘
↖5+7	7+8↗

To select option on landing use 8 to select No and 5 to select Yes. 0 will perform the action you have selected.

Diagonal movements are only possible in the battle phase of the game.

Program notes

Lines

0020-0148 Long range scan
0230-0322 Prints battle screen
0325-0370 Main loop
1090 1014 Prints general instructions
1020 1250 Sets up universe (a$) and UDG
2000 2020 Move left right up and down
2027 2030 Diagonal movements
2500 2645 You fired
2610 2710 You hit
3000 3190 Landing routine
3500 3510 Print wasp or space if on screen
4000 4080 You win
5000 5010 You lose and play death march
7000 7010 Set random colour for wasp and planet

Graphics

A lines	180 1090 and 2080
B	190 1100 and 3130
CDE	320 and 2020
F	2010

NB The character in lines 200 and 1110 is not a space. It is a graphic 8.

The game can be made harder or easier by altering the value of the fuel f in line 1020 or number of aliens x in line 1090 or number of planets x in line 1100 and pn in line 1020.

PROGRAM OF THE WEEK

```
   10 GO SUB 1000
   20 PAPER 1  CLS   FOR y=1 TO 1
6
   30 PRINT INK 5,AT y+2,0,a$(y)
   40 NEXT y
   50 FOR t=c TO c+3
   60 PRINT INK 3, OVER 1, FLASH
1,AT t,d,"  "
   62 NEXT t
   65 PRINT INK 7, FLASH 1,AT 20,
0,"  LONG RANGE SCANNER NOW ACTIV
E"
   66 PAUSE 20
   67 BEEP .03,0
   70 IF INKEY$="" THEN GO TO 65
   75 FOR t=c TO c+3
   80 PRINT INK 5, OVER 1, FLASH
0,AT t,d,"  "
   82 NEXT t
   90 IF INKEY$="8" AND d<28 THEN
 LET d=d+4  BEEP .02,20
  100 IF INKEY$="5" AND d>0 THEN
LET d=d-4  BEEP .02,15
  110 IF INKEY$="6" AND c<12 THEN
 LET c=c+4  BEEP .02,20
  120 IF INKEY$="7" AND c>3 THEN
LET c=c-4  BEEP .02,15
  130 IF INKEY$="0" THEN GO TO 15
0
  140 GO TO 50
  150 FOR s=1 TO 4  FOR t=1 TO 7
PAPER t  CLS   BORDER t-1  BEEP
.01,t+s  NEXT t  NEXT s  BORDER
0  PAPER 0  CLS
  155 LET al=0  LET p=0  LET h=0
  160 FOR y=c-2 TO c+1
  170 FOR x=d+1 TO d+4
  180 IF a$(y,x)="x" THEN LET al=
al+1
  190 IF a$(y,x)="●" THEN LET p=p
+1
 200 IF a$(y,x)=" " THEN LET h=1
  210 NEXT x
  220 NEXT y
  225 IF al=0 AND p=0 AND h=0 THE
N GO TO 3700
  227 IF al=0 AND h=1 THEN GO SUB
 4000
  228 IF al=0 AND p>0 THEN GO SUB
 3000
  230 INK 7  PLOT 0,24  DRAW 255,
0
  235 LET xa=INT (RND*16)  LET ya
=INT (RND*32)
  237 GO SUB 7000
  240 FOR t=0 TO 5  BEEP .02,20+t
  NEXT t
  250 PRINT INK 0, PAPER 3,AT 0,3
,"  TOTAL ALIENS KILLED =  ";ta,"
 "
  260 PRINT PAPER 6, INK 0,AT 19,
14 "  COMPUTER SHOWS  ",AT 20,14
,"THERE ARE ",al," ALIENS",AT 21
,14," AND ",p," PLANETS HERE", PA
PER 0, INK 7,AT 21,0,"FUEL = ",f
  270 PRINT INK 4,AT 19,0,"L____"
, INK 2,"____", INK 4,"____R"
  280 PRINT INK 4,AT 20,0,"U____"
, INK 2,"____", INK 4,"____D"
  290 PRINT AT 21,7,f;"  "
  295 INK 7  PLOT ya+36,18  PLOT
xa+42,10
  310 PRINT INK 6,AT 9,15,">",AT
9,17,"<"
  320 LET b$=" "
  322 GO SUB 3500
  325 LET f$=INKEY$
  326 IF f$="0" THEN GO SUB 2500
  328 IF f$<>"" THEN GO SUB 2000
  330 IF IN in<>255 THEN GO SUB 2
027
  340 IF INKEY$="0" THEN GO SUB 2
500
  345 LET b$="  "
  347 GO SUB 3500
  355 LET ya=ya-(ya<15)+(ya>14)
  360 LET xa=xa+(xa>9)-(xa<9)
  370 GO TO 270
 1005 LET m$="             YOUR MISSI
ON
                TO FIND AND DESTRO
Y THE SWAPMS   BREEDING GROUND. Y
OU START WITH   250 UNITS OF FUEL
 AND THIS       DECREASES RAPIDLY
AS YOU MOVE     AND FIRE.

                LANDING ON A PLANE
T GIVES YOU     AN EXTRA 50 UNITS
OF FUEL.
                YOU CAN ONLY LAND
ON EACH         PLANET ONCE.

                YOU SCORE 5 POINTS
 FOR EACH       ALIEN YOU DESTROY.
                1 POINT FOR EACH U
NIT OF FUEL     REMAINING.
                AND 75 POINTS FOR
EVERY PLANET    LEFT."
 1006 LET r=2   LET k=0  LET l=LEN
 m$
 1007 FOR n=1 TO l
 1008 IF k<32 THEN GO TO 1010
 1009 LET r=r+1  LET k=0
 1010 PRINT AT r,k,"■"
 1011 BEEP RND/100,RND*50
 1012 PRINT AT r,k,m$(n)  LET k=k
+1
 1014 NEXT n
 1020 PAUSE 50  CLEAR   LET c=3
LET pn=16  LET d=0  LET f=250  R
ESTORE   DIM a$(16,32)  LET in=5
9390  LET ta=0
 1022 PRINT FLASH 1, BRIGHT 1,AT
```

```
1,9,"INITIALISING
1026 GO TO 1090
1030 FOR y=0 TO x
1040 LET a=INT (RND*18): IF a<1
OR a>16 THEN GO TO 1040
1050 LET b=INT (RND*32): IF b<1
OR b>32 THEN GO TO 1050
1060 IF a$(a,b)<>" " THEN GO TO
1040
1070 LET a$(a,b)=c$
1083 NEXT y
1085 RETURN
1090 LET x=60: LET c$="x": GO SU
B 1030
1100 LET x=16: LET c$="@": GO SU
B 1030
*1110 LET x=1: LET c$=" ": GO SUB
 1030
1193 BORDER 0
1200 FOR t=0 TO 7
1213 FOR a=144 TO 149: READ b: P
OKE USR CHR$ a+t,b: NEXT a
1220 NEXT t
1230 DATA 0,0,0,96,96,66,0,24,0,
240,240,155,36,60,3,153,152,0,24
,126,4,7,12,0,24,126,3,252,226,2
4,36,60,15,255,240,60,0,24,31,25
3,245,126,0,0,3,248,224,255
1250 GO TO 20
2000 LET b$=" "
2005 GO SUB 3500
2010 LET ya=ya+(3*(f$="5"))-(3*(
f$="8"))
2020 LET xa=xa+(3*(f$="7"))-(3*(
f$="6"))
2025 GO TO 2070
2027 LET b$=" ": GO SUB 3500
2030 LET xa=xa-(3*(IN in=235 OR
(IN in=239 AND INKEY$<>"6" AND I
NKEY$<>"5"))+(3*(IN in=231 OR I
N in=243))
2050 LET ya=ya-(3*(IN in=235 OR
IN in=243))+(3*(IN in=231 OR (IN
 in=239 AND INKEY$<>"6" AND INKE
Y$<>"8")))
2065 IF INKEY$="0" THEN GO SUB 2
500
2070 LET b$="  ": GO SUB 3500
2035 LET f=f-1: IF f<0 THEN GO T
O 5000
2090 RETURN
2500 INK 7: PLOT 110,24: DRAW 22
,75: DRAW 22,-75
2505 LET f=f-4
2510 BEEP .2,15: BEEP .2,20
2520 INVERSE 1: PLOT 110,24: DRA
W 22,75: DRAW 22,-75: INVERSE 0
2525 IF f<0 THEN GO TO 5000
2530 IF xa=9 THEN GO TO 2600
2540 RETURN
2600 IF ya=15 OR ya=16 OR ya=14
THEN GO TO 2610
2605 RETURN
2610 PRINT INK 2; FLASH 1; BRIGH
T 1;AT xa,ya;"   "
2615 FOR t=0 TO 6: BEEP .1,15: B
EEP .1,20: NEXT t
2617 PRINT AT xa,ya;"   "
2620 LET ta=ta+1: LET al=al-1
2645 GO SUB 2670
2650 IF al=0 AND h=0 AND p=0 THE
N GO TO 20
2655 IF al=0 AND h=1 THEN GO TO
4000
2660 IF al=0 AND p>0 THEN GO SUB
 3000
2665 GO TO 235
2670 FOR y=c-2 TO c+1
2675 FOR x=d+1 TO d+4
2680 IF a$(y,x)="x" THEN LET a$(
y,x)=" ": RETURN
2690 NEXT x
2700 NEXT y
2710 RETURN
3000 CLS : PRINT INK 6;AT 19,4;"
COMPUTER REPORTS SHOW THERE ";AT
20,4;" TO BE A PLANET HERE. DO Y
OU";AT 21,10;" WISH TO LAND"
3005 PRINT INK 7;AT 21,0;"FUEL =
 ";f
3010 LET m=1
3020 PRINT FLASH 1; INK 7;AT 21,
25;"YES"; FLASH 0;AT 21,30;"NO"
3025 BEEP .2,25: BEEP .3,20
3030 IF INKEY$="0" AND m=1 THEN
LET m=0: BEEP .2,10: PRINT INK 7
; FLASH 0;AT 21,25;"YES";AT 21,3
0; FLASH 1;"NO"
3040 IF INKEY$="5" AND m=0 THEN
LET m=1: BEEP .2,20: PRINT FLASH
 1;AT 21,25;"YES";AT 21,30; FLAS
H 0;"NO"
3050 IF INKEY$="0" AND m=0 THEN
GO TO 20
3060 IF INKEY$="0" AND m=1 THEN
GO SUB 7000: GO TO 3080
3070 GO TO 3030
3080 CLS : LET m$="
                                PRIN
T AT 10,0; INK 5; FLASH 1;m$;" L
ANDING IN PROGRESS";m$: LET m$="
"
3085 FOR t=0 TO 5: BEEP .01,20:
NEXT t
3090 FOR x=24 TO 44
3100 PLOT 0,4: INK cl: DRAW 255,
0,-PI/4
3105 BEEP .01,25
3110 NEXT x
3120 LET pn=pn-1: LET f=f+50
3130 PRINT INK 6;AT 20,2;"REFUEL
ING COMPLETE FUEL = ";f
3135 FOR t=5 TO 30 STEP 0: BEEP
.1,t: NEXT t
3140 FOR y=c-2 TO c+1
3150 FOR x=d+1 TO d+4
3160 IF a$(y,x)="@" THEN LET a$(
y,x)=" ": GO TO 3190
3170 NEXT x
3180 NEXT y
3190 FOR t=0 TO 150: NEXT t: GO
TO 20
3500 IF xa>0 AND xa<18 AND ya>-1
 AND ya<28 THEN PRINT INK cl;AT
xa,ya;b$
3510 RETURN
3705 PRINT INK 5;AT 19,0;"SCANNE
R REPORT"; INK 7;" SECTOR IS EM
PTY. RETURNING TO LONG RANGE SCA
N."
3706 BEEP .3,0: BEEP .4,-10
3710 PAUSE 350: GO TO 20
4000 PAPER 1: CLS : PRINT INK 6;
 FLASH 1;AT 21,0;" CONGRATULATIO
NS YOU HAVE FOUND ": POKE 23692,
255: PRINT INK 6; FLASH 1;'';" T
HE SWARMS BREEDING GROUND
  AND THEREFORE COMPLETED YOUR
 '',TAB 11,"MISSION
 "
4010 PRINT INK 7; BRIGHT 1;'" SC
ORE *'''' PLANETS LEFT *75 = ";p
n*75 '''" PLUS"''' REMAINING FUEL
 = ";f;''' PLUS"''' TOTAL ALIENS
 DESTROYED *5 = ";ta*5; INK 5; F
LASH 1;''' TOTAL SCORE = ";(pn*7
5)+(ta*5)+f
4060 FOR t=1 TO 5
4070 FOR y=10 TO 20: BEEP .05,y
 NEXT y
4080 NEXT t
4090 PRINT INK 4; FLASH 1; BRIGH
T 1;AT 17,6;"PRESS FIRE TO PLAY
AGAIN"
4100 IF INKEY$="0" THEN GO SUB 1
020: GO TO 20
4110 IF INKEY$="" THEN GO TO 410
0
4130 STOP
5000 PRINT PAPER 1; BRIGHT 1;AT
3,3;" YOU HAVE RUN OUT OF FUEL "
;AT 6,3;" AND ARE DOOMED TO DRIF
T ";AT 7,3;" IN THE EMPTYNESS O
F ";AT 9,3;" SPACE FOR EVER
!!!!!!!!!! "
5010 BEEP .75,15: BEEP .75,16: B
EEP .3,15: BEEP .75,15: BEEP .75
,18: BEEP .3,17: BEEP .75,17: BE
EP .3,15: BEEP .75,15: BEEP .3,1
4: BEEP .75,15
5020 GO TO 4090
7000 LET cl=INT (RND*7): IF cl<2
 OR cl>7 THEN GO TO 7000
7010 RETURN
```

Space Wasps
by P Hackett

Deathrace 2000

on Vic20

This game is based on the feature film *Deathrace 2000*. It makes full use of the Vic's facilities including the auto repeat hi-res and sound.

Instructions are included within the game but the basic idea is to race at breakneck speed avoiding the oncoming police cars and hitting the pedestrians whilst staying on the track.

Program notes

Lines	
130-160	Set up hi-res initialise sound and variables
195-340	Print track, scroll it, move car and put up pedestrians and police cars
500-640	Instructions in lower case
1000-1175	Print and sound explosion
1176-1200	Score and hi-score

```
10 REM***(C)C.ANDERSON1982***
20 REM***FROM THE FILMDEATHRACE
   2000***
100 POKE36879,93 PRINT"
   ZINSTRUCTIONS(Y/N)"
110 GETA$ IFA$="N"THEN130
120 IFA$="Y"THENGOSUB500 GOTO130
125 GOTO110
130 PRINT"Z" POKE52,26 POKE56,26
   CLR
140 FORA=7168TO7679 POKEA,PEEK
   (A+25600) NEXT POKE36869,255
150 FORA=7432TO7479 READB POKEA,
   255-B NEXT
160 DATA0,0,0,0,0,0,0,0,60,126,
   126,60,60,60,126,24,24,24,126,
   90,24,36,36,102
170 DATA24,126,60,60,60,126,126,
   60,15,15,15,15,240,240,240,240
175 DATA240,240,240,240,15,15,
   15,15
180 SC=0 POKE650,128 B=10 C=12
   POKE36878,15 POKE36874,128
   TI$="000000"
190 REM***RACE TRACK***
195 FORX=1TO22 PRINTTAB(B)"■''''''"
   NEXT
200 A=INT(RND(1)*3)-1
210 B=B+A
220 IFB<1THENB=1
230 IFB>CTHENB=C
240 IFRND(1)<.1THENPRINTTAB(B)
   "'#''" GOTO200
245 IFRND(1)>.9THENPRINTTAB
   (B)"■''$''" GOTO200
250 PRINTTAB(B)"■''''''"
260 GETA$ IFA$="<"THENC=C-1
270 IFA$="."THENC=C+1
280 IFC<1THENC=1
290 IFC>21THENC=21
300 POKE7680+C,34
310 D=PEEK(7680+C+22)
320 IFD=32ORD=36THENGOTO1000
330 IFD=35THENSC=SC+20 POKE36874,0
   POKE36875,200 FORL=1TO30
   NEXT POKE36875,0 POKE36874,128
340 GOTO200
500 POKE36869,242
510 PRINT"Z THIS IS A COMPUTER
   VERSION OF THE FEATURE FILM
   'DEATH RACE 2000'.",
520 PRINT" IN THE GAME YOU RACE
   THROUGH THE STREETS
   OF NEW YORK"
530 PRINT" AND TRY TO KNOCK
   DOWN AS MANY ",
535 PRINT" PEDESTRIANS AS YOU
   CAN WHILST AVOIDING THE"
540 PRINT"POLICE CARS."
550 PRINT"##      LITTLE MAN!"
560 PRINT"#       POLICE CAR!"
570 IFPEEK(197)=64THEN570
580 POKE36869,240
590 PRINT"Z YOUR CONTROLS ARE "
600 PRINT" < LEFT"
610 PRINT" . RIGHT"
620 PRINT"#        HIT A KEY"
630 FORA=1TO100 NEXT IFPEEK
   (197)=64THEN630
640 RETURN
1000 POKE36879,42
1020 POKE7680+C,37 POKE7680+C+1
   ,38
1040 POKE7680+C+22,38 POKE7680+C+23
   ,37
1050 POKE38400+C,1 POKE38400+C+1,1
1060 POKE38400+C+22,1 POKE38400+C+
   23,1
1070 POKE36877,0
1090 POKE36875,0
1100 POKE36874,0
1110 POKE36877,200
1120 FORL=15TO0STEP-1
1130 POKE36878,L
1140 FORM=1TO300
1150 NEXT
1160 NEXT
1170 POKE36877,0
1175 FORN=1TO1000 NEXT
1176 PRINT"ZTIME="INT(TI/60)
1177 PRINT"##SCORE="SC
1178 IFSC>HITHENHI=SC
1179 PRINT"###HI SCORE="HI
1180 FORA=1TO3000 NEXT
1185 PRINT"ZAGAIN(Y/N)"
1190 IFPEEK(197)=64THEN1190
1200 IFPEEK(197)=11THEN130ELSEEND
```

Deathrace 2000
by C Anderson

River Cross

on ZX81

This is the computer version of the childrens game the object of which is for a man to cross a fox a hen and a bag of corn from one side of the river to the other in the minimum number of crossings, but only taking one passenger at a time

The man must not leave behind certain incompatible combinations, ie hen with the fox and/or corn in which case you have failed and the game is over To move man and/fox or hen or corn enter the appropriate number To cross the man only enter 1 The program also takes into account invalid moves Uses 2K

```
10 REM"CROSS THE RIVER"
20 LET A$="MFHC"
30 LET B$="    "
40 FOR A=3 TO 19
50 PRINT AT A,5;"(21GRAPHIC SPACES)"
60 NEXT A
70 FOR A=9 TO 12
80 PRINT AT A,6;"(21GRAPHIC A's)"
90 NEXT A
100 FOR A=11 TO 20 STEP 3
110 PRINT AT 7,A;CHR$(((A-8)/3)+156)
120 PRINT AT 8,A;A$((A-8)/3)
130 PRINT AT 13,A;" "
140 NEXT A
150 LET S=0
160 PRINT AT 16,10;"(2GRAPHIC SPACES,2SPACES)SAFE(2SPACES,2GRAPHIC SPACES)"
170 INPUT D
180 IF D<1 OR D>4 THEN GOTO 170
190 IF D>1 AND A$(1)=" " AND A$(D)<>" " THEN GOTO 490
200 IF D>1 AND B$(1)=" " AND B$(D)<>" " THEN GOTO 490
210 IF D=1 THEN GOTO250
220 LET C$=A$(D)
230 LET A$(D)=B$(D)
```

Continued on page 38

Wink

on Dragon 32

This program shows how you can draw pictures secretly on the graphics pages and then use the screen command to show the finished product

```
5 REM ***THE WINK***
10 CLS PCLEAR8
15 PRINT@201,"WAIT FOR IT!!"
20 FOR P=1 TO 4
30 PMODE0,P:PCLS
40 CIRCLE(194,50),12,3
50 CIRCLE(122,100),15,3
60 CIRCLE(194,50),2,3
70 CIRCLE(50,50),24,3,1.5,.5,0
80 CIRCLE(194,50),24,3,1.5,.5,0
90 NEXT P
100 PMODE0,1
110 CIRCLE(50,50),12,3
120 CIRCLE(50,50),2,3
130 LINE(70,170)-(96,150),PSET
140 LINE-(156,150),PSET
150 LINE-(176,170),PSET
160 PMODE0,2
170 CIRCLE(50,50),12,3
180 CIRCLE(50,50),2,3
190 LINE(70,150)-(176,150),PSET
200 PMODE0,3
210 CIRCLE(50,50),12,3
220 CIRCLE(50,50),2,3
230 LINE(70,130)-(90,150),PSET
240 LINE-(156,150),PSET
250 LINE-(176,130),PSET
260 PMODE0,4
270 LINE(42,50)-(58,50),PSET
280 LINE(70,130)-(90,150),PSET
290 LINE-(156,150),PSET
300 LINE-(170,130),PSET
310 FOR P=1 TO 4
320 PMODE0,P:SCREEN1,1
330 FOR DL=1 TO 800:NEXT DL
340 NEXT P
350 FOR DL=1 TO 500:NEXT DL
360 GOTO 310
```

Wink
by Y Grainger

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```
240 LET B$(D)=C$
250 LET C$=A$(1)
260 LET A$(1)=B$(1)
270 LET B$(1)=C$
200 LET S=S+1
290 FOR A=11 TO 20 STEP 3
300 PRINT AT 8,A;A$((A-8)/3)
310 PRINT AT 13,A;B$((A-8)/3)
320 NEXT A
330 IF A$=" FN " OR A$="  NC" OR A$=" FNC" THEN GOTO 370
340 IF B$=" FN " OR B$="  NC" OR B$=" FNC" THEN GOTO 370
350 IF A$="    " THEN GOTO 420
360 GOTO 170
370 PRINT AT 16,11;"X(SPACE)DANGER(SPACE)X"
380 PRINT AT 17,11;"TRY AGAIN "
390 FOR A=1 TO 70
400 NEXT A
410 GOTO 20
420 PRINT AT 16,11;"WELL DONE"
430 PRINT AT4,7;"YOU CROSSED ";S;" TIMES"
440 PRINT AT 18,9;"WOULD YOU LIKE"
450 PRINT AT 19,7;"ANOTHER GO"
460 INPUT T$
470 IF T$<>"Y" THEN STOP
480 GOTO 20
490 PRINT AT 16,10;"INVALID MOVE"
500 FOR A=1 TO 50
510 NEXT A
520 GOTO 150
```

River Cross
by Paul Weedon

Ring of darkness . . .

Picture this at the bottom of a dark river a trio of sirens are singing about a hoard of gold that they have hidden A mortal overhears them and learns that he who makes a ring from the gold will rule the world Of course he steals the gold!

Meanwhile in the castle of the gods much lamentation is in evidence — two giants have built the castle but in payment require the goddess of youth and beauty, without whom the gods will lose their eternal youth The god of fire mentions the theft of the gold and offers to recover the gold for the giants in return for the goddess's freedom

The gods find the mortal thief who has made a magic helmet for himself — this enables the wearer to assume any shape he desires The god of fire tricks him into turning himself into a toad, in which shape he is easily captured, along with his gold

This is just the beginning of an epic tale of deception love and hate, with gods and mortals battling it out with assorted monsters, the most fantastic of which is a dragon The young hero having eventually braved an enchanted circle of fire to rescue a beautiful girl the daughter of the gods kills the dragon whose blood enables him to hear the animals speak.

Is this the latest adventure scenario from Scott Adams or Melbourne House? Unfortunately, no! It is actually a very brief section of *Der Ring Des Nibelungen* the gigantic cycle of operas written by Wagner As someone once said Wagner has some thrilling moments — but also some very boring half hours! But the story lines are an extremely rich source of ideas for adventure scenarios, and show that inspiration can come from anywhere

Thanks to my colleague on the *Popular Computing Weekly* team John Scriven I can include another gothic tale of mystery and intrigue (no, it's not his battle to get expenses from the Editor!)

Maxon stood on the edge of the forest path In the distance he could see the towers of Borderion He could feel the weight of the moneybelt round his waist and looked forward to reaching the safety of the town After stocking up with food and drink he would invest in an axe at the weapon store.

His dim memory of past existences reminded him of battles when he'd been almost invincible All he needed was a trusty axe and his leather armour He cast his mind back to the last fateful time his spirit had entered the underground maze — at the bottom of the ladder he'd been wounded by a bat and his body had died lost in the labyrinthine twistings of the tunnels It was lucky that he'd been resurrected

Suddenly he was wide awake A snapping twig caused him to look up and there in the middle of the path stood an evil figure Maxon turned and drew his short dagger With a roar like an enraged bull he leaped on the bandit that had appeared in front of him A few seconds later it was all over

Maxon wiped his blade clean on the grass and pocketed the half-dozen gold coins that lay near the body With the cool breeze in his hair, he strode on to the town

Where Almaraz the wizard and Zus the thief had failed before him he knew that he Maxon the warrior, had enough strength and resourcefulness to cope with any situation Magic? You could keep it! At least for the moment

Maxon and the others are characters that inhabit my copy of *The Ring of Darkness* from Wintersoft, an adventure for Dragon 32 owners At the start you choose a name for your character and whether it should be human dwarf or elf and warrior thief or wizard Some points for intelligence and strength can be shared as you think best — others are awarded according to the type of character

As you can see the start is similar to *Dungeons and Dragons* type games The quest itself takes place on a screen map of the land complete with lakes and islands Small towns are dotted around where you may purchase food and supplies or sell excess booty A separate high resolution plan of each town appears on the screen

Should you wish to explore underground (vital if you wish to find the *Ring of Darkness*), there are several entrances — this part of the adventure involves loading a separate program that contains the 3D graphics of the tunnels

You can save your chosen character on tape each time you play as being killed merely increases experience points for your reincarnated character — an ideal game for Buddhists!

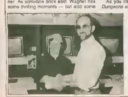
Should your initial choice of character prove unsatisfactory you can change to an elf wizard with more intelligence or indeed any combination you think more likely to succeed

Although £10 is plenty to pay for a cassette this program is good value combining as it does several adventure games in one And the ring of the title? I pin my faith on Maxon unless the hidden archer gets him again!

Before I get to this week's problem letter I'd just like to say thank you to all the people who responded to my plea some weeks ago for a definitive solution to *The Hobbit* — I received several through the post, and also some personally from people who came to the stand at the last Microfair at Alexandra Pavilion (the best so far, don't you think — thanks Mike Johnston) I shall feature these in a corner on *The Hobbit* which I hope to get together in a couple of weeks

On to our pleas for help — this is the first one for an Oric adventure I F Letcher from Bognor Regis is in the middle of *Zodiac* in which the idea is to collect six treasures and, of course, the 12 signs of the Zodiac Unfortunately he's only got five treasures and 10 signs — pretty good going I think! A safe in a bedroom is causing the trouble does anyone have a clue to opening it?

Mr Letcher is also wondering if there is a method of negotiating mazes a nasty example of which turns up in *Zodiac* One obvious way is to make a map but I realise that they are usually harder than that So try dropping, if you can some of those treasures that you've collected If you do this at strategic points you should be able to retrace your steps fairly easily as the computer tells you what is at each location ■



FIFTEEN-year-old Neil Mullins won Carnell Software's *Volcanic Dungeon* championships, at the recent Computer Fair in Earls Court

It took Neil just 58 minutes to beat the other six finalists His prize, which was presented by Tony Bridge, consists of a holiday for two in Florida, complete with visits to the Epcot Centre and Disney World The six runners-up all received £50 of software.

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge Adventure Corner *Popular Computing Weekly* Hobhouse Court 19 Whitcomb Street London WC2 7HF



HISTORY BOOK

Jackie Woodhouse of Coopers Walk, Watford writes

Q I will be starting my computer O-level course next year. I would like to know if there is any book, that is not too difficult, that will tell me something about the history of computers. I would also like something that is not too long to read.

A There is a very good paperback available called *The Myth of the Micro* by Rodney Dale and Ian Williamson. It has about 40 pages on the history of computing from Napiers bones to the growth of Silicon Valley. You might well find this a useful book for computing generally, though it seems quite hard to find. I actually got my copy on the west coast of Scotland — it was the only computer book in a large sweet shop!

It is a Star book published by the paperback division of W H Allen. The ISBN is 0 352 30643 2.

HIGH VOLTS

Royston Blythe of Sutton Square, Heston, Middx writes

Q I own a 48K Spectrum. Could you please tell me if there is a *Poke* or *Out* command that will enable any of the exposed edge connections at the back of the computer to become electrically positive or negative. If it is possible to do this, would it affect the printer in any way?

A You cannot directly use either the *Poke* or the *Out* command to get a negative voltage on any of the computer lines. Usually you can only get 5v or 0v. As any address is only on the lines for a few micro seconds, if you want to change it you will, in effect, have to capture it. This can be done with a digital port. It would then be possible to add on a small battery amplifier. So whenever a 0v is on the battery will create a negative voltage. If you use a digital port with a mother board then you will be able to use a printer as well.

LYNX QUESTIONS

Gary Gluckman of Mynor Avenue, Highland Estate, Cape Town, South Africa writes

Q I would like to know some things about the Lynx. First, when will the Lynx enter South Africa? Secondly, will you be publishing Lynx software? Thirdly, how much will the Lynx cost in rands and cents?

A By the time you read this, we will already have published some Lynx programs. As for availability in South Africa, yes the Lynx will be going out there, but no dealership has been arranged yet, hence no price. I would not expect it to arrive until the autumn at the earliest though it would seem logical to have it available for Christmas.

COMEX DETAILS

Philip Judd of Penton, Stoke-on-Trent, writes

Q I have seen the announcement of the Comex Home Computer for £150. Could you give me any details? I know that it has 35K Ram and 16K Rom.

A At the time of writing I cannot add much to that as we have not yet seen one. It uses a chip that I know little about, the 1802. It has a proper keyboard, and interestingly a joystick as well. It has colour and sound and can be used with an ordinary cassette recorder.

BREAK-PROOF!

C J Pratt of County Oak Avenue, Brighton, Sussex writes

Q I would be grateful if you could help me. I have a 48K Spectrum and I would like to know how to make my programs break-proof. I have tried several routines, but without success. I can only imagine that a special *Poke* instruction is needed.

A Not so, I'm afraid. There is already a constant battle between the manufacturers and the copiers, neither side being very willing, for obvious reasons, to give away their secrets. As the state of the art stands at the moment, any program that can be written for the Spectrum can be broken, though some are more difficult than others.

I can only say that anyone who is writing programs would be well advised to put a copyright note on the program and make it clear that no unauthorised copying is allowed.

INDEX LIST

B Luckenham of Denly Road, Manchester writes

Q Can you tell me whether there is an index maintained by any agency of popular science, computer, or electronics journals. The national computer centre lists extracts and references, but only of academic journals.

I am trying to trace an article on speech synthesis which I saw in a magazine on a newsagent's rack between July and September 1982 — I cannot now trace the reference. There would seem to be a need for an index but despite the educational value, no one seems to produce such a list. There is a commercial company that indexes computer games and listings, but apparently not the features and articles.

Perhaps one of your readers could fill this gap.

A The simple answer to this is no, but I heartily endorse your sentiments that such an index would be useful. I for one find it very difficult to keep up with all the new developments — I get on average one magazine every three days, but I still miss a lot of stuff, which I only get to hear about a few weeks later.

However, a number of magazines do compile their own indexes — you can get a 1982 index for *Popular Computing Weekly* by sending £1.20 to PCW Index, Hobhouse Court, 19 Whitcomb Street, London WC2.

SPECTRUM COVERTER

Jackie Tennant of Theatre Road, Watford, writes

Q I have recently purchased a Vic20, and am getting along with it very well. With the help of a friend who has a Spectrum I am converting some of the numerous Spectrum programs to my computer (I have the 3K Ram and Super Expander Cartridge). However, some of the long program lines in the Spectrum programs will not be accepted on my Vic20. Instead I have to use more than one line.

Is this just the way the Vic works, or is there anything wrong with it?

A The reason for this is that the Vic20, like some other computers has a limit on line length of program lines. In the case of the Vic this is 255 bytes. For most purposes I would have thought this was quite sufficient but of course fewer lines means that extra space can be made. A Vic with only 3K extra Ram will still only have 6.5K user available Ram to the 16K Spectrums 9K user available Ram. So if you are dealing with programs that come close to filling up the 16K Spectrum's memory, you will probably find that there simply will not be enough room to transfer them to your Vic in Basic, however many space saving techniques you use. But there are plenty of Vic games around or you can improve your programming by trying to completely rewrite the Spectrum games for the Vic.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, PCW, Hobhouse Court, 19 Whitcomb Street, London WC2 7HF.



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32 VERSION



Some Vic owners would claim that *Gridrunner* by Jeff Minter was about the best arcade-style game available on the machine. Now a version is available for the Dragon 32 so its cult following can be extended further.

Using a joystick you pilot your ship — the *Gridrunner* — around a high power station known as the grid. The grid is the earth's last hope for survival since all the natural energy supplies have been used up. But it has been invaded by a race of evil droids who are moving in linked squads across the grid.

If all this sounds confusing, imagine a cross between *Amidar* and *Catterpilla* — the object is, of course, to destroy the droids.

Program *Gridrunner*
Price *£7.95*
Micro *Dragon 32*
Supplier *Salamander Software, 17 Norfolk Road, Brighton, East Sussex BN1 3AA*

DISPLAYED

Dlan Display Language is an unusual utility for the Spectrum. In effect it is a dedicated machine code language to manipulate the screen easily.

The central idea is the window, a defined rectangle of lines and columns which can be individually manipulated apart from the rest of the screen enabling a range of graphics effects.

Dlan also has a range of print styles which can be used within each window. Although it is supposed to be interesting just in itself, the program is intended to have a practical use within small businesses where it could be used for advertising displays.

Program *Dlan Display Language*
Price *£7.95*
Micro *Spectrum 16/48K (48 has more type fonts)*
Supplier *Campbell Systems, 15 Rous Road, Buckhurst Hill, Essex IG9 6BL*

ALL MODELS

All things considered, there are not all that many books for the Oric — perhaps half a dozen compared to the 30 or more available for the Spectrum at the same point in its life.

Therefore Oric owners may be genuinely interested in a new book called The Oric 1 Program Book.

The book contains 50 programs for all models of Oric covering games, graphic displays and machine code techniques.

Book *The Oric 1 Program Book*
Price *£5.95*
Micro *Oric 1*
Supplier *Phoenix Publishing Associates, 14 Vernon Road, Bushey, Herts WD2 2JL*

UNSAVOURY!

The cover of *Breakaway* from Procom features a woman tied to a post. Large letters tell us that time is running out and we must quickly release her bonds before ... well, before something or other.

To release her bonds, keys must be pressed as quickly as possible — in this sense the game can be seen as a keyboard trainer since to press them quickly you will have to be very familiar with the layout.

Part of the cover blurb describes the program as "a unique game for the whole family. Guaranteed to amuse and frustrate". Hmmmm. I wonder how much of a – – – –ist you have to be to find the whole concept a bit unsavoury.

Program *Breakaway*
Price *£5.95*
Micro *Spectrum 16/48K*
Supplier *Procom Software, Museward, 309 High Road, Loughton, Essex*

CHECKED!

Sinclair has just issued six new cassettes for its machines. Some of these are programs which have been adopted by Sinclair from other companies — Artic's *Forth* for example.

One program appearing under the Sinclair banner which has not been released before, or at least not in this form, is Intelligent Software's *Cyrus Is Chess*.

This is hardly the first Spectrum chess program on the market. However, the core of this program has beaten *Cray Blitz*, a high speed chess program running on an enormous Cray — a machine that costs rather more than £129.

The usual problem with chess programs is that, even though they play quite well at their higher skill levels, they take so long to decide on their move that they are impossible to use in a sensible way. *Cyrus* has been designed to play well while responding quickly.

Program *Cyrus Is Chess*
Price *£9.95*
Micro *Spectrum 48K*
Supplier *Sinclair Research, Stanhope Road, Camberley, Surrey*

ALL BETS

Vic20 owners can now gamble with their computer.

Pontoon is a version of the card game in which you can play against the computer and bet on your hand.

The program requires at least 6.5K although either a 3K Ram pack or a Super Expander will work.

Program *Poker*
Price *£5.90*
Micro *Vic20 (6.5K)*
Supplier *David Charles, 88 Mount Pleasant Road, Castle Gresley, Nr Burton-upon-Trent, Staffs DE11 9JG*

****

COMING SOON

In a couple of [illegible] Ultimate Play the [illegible] has built up a reputation almost unequalled in the Spectrum Games market — and purely on the strength of two releases, *Psst* and *Jet Pac*.

The company is soon to release two more games for the Spectrum, *Tranz Am* and *Cookie*. The first is described as a "real time car chase game set across America" with "one of the largest continual game play areas ever designed for the Spectrum" — suddenly, it seems, everyone is waking up to the lack of good car games on the machine.

Cookie is a "novelty" game about which I know little except that it features "Charlie Chef and the Ingredients" battling it out with "Bin Monster and the Nasties". As a guess I'd say it's probably inspired by the arcade game where you run around the screen making hamburgers and fighting off roving fried eggs, bacon, etc.

Both these games can be expected around the beginning of August and will probably retail for £5.50.

PRIVATE EYE



Franklin's Tomb contains an unusual solution to the problem of combining graphics and text on an adventure game — the pictures which may contain clues, are contained within the booklet that comes with the program

Your task in this adventure is to explore a crypt and unlock a puzzle — the solution will give clues to other adventures in the series The computer has a vocabulary of about 50 verbs and 80 nouns

You are a Chandler like private detective — Dan Diamond — who is given, at the opening of the adventure, a mysterious letter by a beautiful stranger asking for help "You could cut a piece of paper with the creases in her uniform but she moved like honey on a hot day"

Whatever the game is like it certainly gets my vote for blurb of the week

Program *Franklin's Tomb*
Price *£9 95*
Micro *Dragon 32*
Supplier *Salamander*
17 Norfolk Road
Brighton
East Sussex BN1 4AA

WORD WRAP

There are two problems with any attempt to turn your Spectrum into an effective word processor

The most obvious is the keyboard which is entirely unsuitable for any sort of fast typing This however, can be solved by the addition of one of the add on "real" keyboards currently available

The other problem is the printer — a dot matrix or daisy wheel will be required for letters, etc, and that means buying an interface to connect it to your machine

The problem is that the various interfaces all have to be adapted to function with the particular coding of any word processing program In the past this information has been elusive to say the least

Full marks then to Tasman who has included in its explanatory booklet, for the new *Tasword Two Word Processor*, a leaflet explaining how to use the program with five of the most popular interfaces

The program gives 64 characters to the line and allows margins and the relocation of text in blocks as well as all the earlier *Tasword* features of word wrap, justification and word search/replace

Program *Tasword Two*
Price *£13 90*
Micro *Spectrum 48K*
Supplier *Tasman Software*
17 Hartley Crescent
Leeds LS6 2LL

PLANTED

If the recent Commodore show is anything to go by the 64 is likely to be a very successful machine As yet there have been few software releases for the 64 but the situation is changing rapidly

Supersoft is one of the main companies in this market so far Its latest release is *Kaktus* — a game for plant lovers

You must defend your cactus, the last standing in the desert, from all the animals who would destroy it These include hornets, wasps, buzzards and moles Your plant will die if either the base is eaten away or the ground on either side is eroded

Program *Kaktus*
Price *£8 00*
Micro *CBM 64*
Supplier *Winchester House*
Canning Road
Wealdstone
Harrow HA3 7SJ

REAL TIME

Salamander has converted its well received *Dragon Trek* program to run on the Oric

The aim of all *Trek* games is to clear the galaxy of Klingons To do this you use long and short range scans and various kinds of weapons Battle encounters are likely to damage your ship and you will need to dock at a starbase for repairs

The game comes in three different lengths determined by the size of galaxy you must explore — the degree of difficulty can also be varied from easy to impossible

At various points in the game Lt Uhura will give you helpful messages These and other events all occur in real time, ie, if you leave the room for a moment you may come back to find your ship under attack

Program *Oric Trek*
Price *£9 95*
Micro *Oric 1 48K*
Supplier *Salamander*
17 Norfolk Road
Brighton
East Sussex BN1 4AA

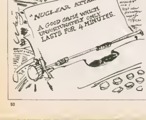
SEALED!

Premier Microsystems has issued a range of games for the Dragon, specialising particularly in adventures

Although pleasingly packaged with a colour cover, the cassette boxes deliberately contain little information — it is left up to you to discover what happens when you play the game

However through exhaustive enquiries I can now exclusively reveal the following information about one of the games — *Dragon Tower* It is set in a tower You must find your way in it You look around You try to get out again Beyond that my lips are sealed

Program *Dragon Tower*
Price *£7 95*
Micro *Dragon 32*
Supplier *Premier Microsystems*
208 Croydon Road
Anerley
London SE20 7YX





Cable, cable

One of my favourite monthly magazines is that august journal *Wireless World* a title which does not really reflect its true coverage. It is an enthralling event to be presented on the one hand with articles on designing a Forth computer (using the 6809 chip), network design using a calculator (TI-58 programmable) and an editorial about information technology (June 1983 issue).

I am an avid reader of the letters to *WW* and noted in the same issue that there was a letter from a person living in Milton Keynes. For once that the person lived in Milton Keynes *is* relevant since Milton Keynes is the only town so far which has many of the technological gadgets we are promised in our future.

As you may know, there are many interested parties who are trying to persuade those in charge that the UK should be cabled — for those who do not know. I am extremely suspicious of the necessity for such cabling and do not believe that people will be silly enough to spend so much money for the services.

This brings me to the letter. The writer says that he had been a user of the Milton Keynes cable tv system for the past two years. During that time he had found that the reliability of the network left a lot to be desired: the system failed on average once every two or three weeks and if the failure was after 6 pm then it remained out of service until the next day.

The actual quality of the television picture was — so the letter claimed — of a lower quality than the normal standards of broadcast reception. Milton Keynes is in a fringe area for reception but the writer found that the quality of the picture was better from a *loft*-mounted aerial (which cost him £5.50).

The reliability and quality of the Milton Keynes system seems therefore to be in some doubt — and the system cannot be that old. This affects arguments about how the UK is to be cabled: are we to be cabled using the high point of technology — optical fibre networks — or are we to be lumbered with the cheaper, less reliable mammoth of coaxial cables?

Most would-be operators seem to wish to cash in on the old coaxial technology, to save money. Fibre optics (and other changes which would be necessary) would obviously be preferable.

But the letter-writer notes that the more complex a system becomes (like a computer program) the more likely it is to fail: he was staying with his little aerial.

That letter was mainly concerned with the quality of tv reception: there is, we are told, far more to cabling than mere television and similar entertainments. A recent attempt to go beyond mere entertainment would seem to be the Micronet 800 system (part of the Prestel system).

Micronet seems to be an expensive way of writing letters or receiving information. I understand — and if I am wrong I am sure to be corrected — that the system works something like this:

(1) Ring up Micronet.
(2) Select what you want to do from a menu.
(3) Either, depending on your choice, find out something and possibly load a program into your computer. Or send a message to another Micronet station.

To access Micronet (and sub-systems such as Rewtel) is expensive.

In addition to a computer you need a means by which your computer can communicate with the system. This means of communication is by an RS232C serial interface. Even if your computer does have such an interface you will still need an adapter (and anyway many computers have *parallel* rather than serial interfaces).

You might, of course, not bother with a computer and instead buy a terminal. A new terminal costs more than most home computers — though it is possible to buy such terminals secondhand.

But the real drawback with Micronet is the rate at which information is passed by the system. This is 300 baud — to give an idea of what that means, it is the rate at which the ZX81 loads (ie, very slow). For comparison the BBC machine usually runs at 1,200 baud, as does the Spectrum. ■

Boris Allan

Just restitution

Puzzle No 63

The backroom boys at the Neverjoy Toy Company had been working long hours in the laboratory developing the formula for the 'Spring' (named after the managing director's dog) bouncing rubber ball.

This ball had the remarkable ability of bouncing back to four fifths of its original height when dropped on to a concrete surface.

This had been demonstrated by letting one drop — on an airless summer day — from the factory roof on to the car park some 250ft below. Measurements had indeed shown that the height reached on each successive bounce was exactly 80 per cent of the bounce before.

Can you say how *far* the ball travelled before it came to rest?

Solution to Puzzle No 58

The program to solve the puzzle contains a routine that might be useful for any work involving primes as the primes are stored in the array *P*. This array has been dimensioned as *P*(500) which is more than enough for the puzzle — containing the first 500 primes in the years up to 3571. The subroutine checks each successive *odd* number to see if it is prime and returns *T* = 0 if no factors are found. Lines 100 to 120 then find the differences between each successive prime and prints out a list of those with a difference of more than 20.

```
10 DIM P(500) 20 LET P(1) = 2 30 LET N = 3 40 FOR
Q = 2 TO 500 50 GOSUB 200 60 IF T = 1 THEN
GOTO 150 70 LET P(Q) = N 80 LET N = N + 2 90
NEXT Q 100 FOR Z = 1 TO 499 110 IF P(Z + 1)
-P(Z) > 20 THEN PRINT P(Z+1), P(Z), P(Z+1)
-P(Z) 120 NEXT Z 130 STOP 150 LET N = N + 2 160
GOTO 50 200 LET T = 0 210 FOR F = 3 TO INT
(SQR(N+0.5)) STEP 2 220 LET S = VAL STR$ (N/F)
230 IF S - INT S = 0 THEN LET T = 1 240 IF T = 1
THEN GOTO 260 250 NEXT F 260 RETURN
```

By running the program it is discovered that:

(i) The next 'pair' of prime years having a gap of 22 years will be 2311 to 2333.

(ii) The next gaps of 24, 28 and 28 will occur in 2179 to 2203, 2477 to 2503 and 2971 to 2999 respectively.

(iii) The largest gap to date was the 34 years between 1327 and 1361.

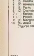
As a point of interest, such a gap will not be equalled again until the 36 years between 9551 and 9587.

Winner of Puzzle No 58

The winner is Denny Langton, Whitmore Close, New Southgate, London, who receives £10.

Top 10

Vic20

1	(2)	Arcadia	(Imagine)
2	(4)	Wacky Waiters	(Imagine)
3	(5)	Catcha Snatcha	(Imagine)
4	(7)	Asteroids	(Bug-Byte)
5	(1)	Panic	(Bug-Byte)
6	(3)	Cosmiads	(Bug-Byte)
7	(—)	Kaktus	(Audiogenic)
8	(—)	Hoppit	(Commodore)
9	(6)	Mangrove	(Audiogenic)
10	(8)	Amok	(Audiogenic)

(Figures compiled by Rams & Co, London)

Top 10

Spectrum




1	2	Penetrator	(Melbourne House)
2	(1)	Flight Simulation	(Psion)
3	(3)	Transylvanian Tower	(Richard Shepherd)*
4	(4)	Jet Pac	(Ultimate)
5	(5)	The Hobbit	(Melbourne House)*
6	(6)	3D Tanx	(DK Tronics)
7	(8)	Ah Diddums	(Imagine)
8	(7)	Horace Goes Skiing	(Psion/Melbourne House)
9	(—)	Hungry Horace	(Psion)
10	(—)	Chess	(Psion)*

*Requires 48K.
(Figures compiled by W H Smith & Son Ltd)

Top 10

Atari




1	(8)	Zaxxon	(Datasoft)
2	(6)	Preppie 2	(Adventure International)
3	(—)	Miner 2049er	(Big Five)
4	(5)	Time Warp	(English Software)
5	(4)	Xenon Raid	(English Software)
6	(7)	Air Strike	(English Software)
7	(8)	Stone of Sisyphus	(Adventure International)‡
8	(—)	Necromancer	(Synapse)†
9	(8)	Pharaoh's Curse	(Synapse)†
10	(—)	Mountain King	(CBS)†

‡32K cassette. †16K cartridge. §48K disc.
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Top 10

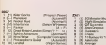
Dragon




1	(1)	The King	(Microdeal)
2	(—)	Talking Android Attack	(Microdeal)
3	(—)	Nightflite	(Salamander)
4	(4)	Dragon Trek	(Wintersoft)
5	(3)	Space War	(Microdeal)
6	(—)	Graphics System	(Salamander)
7	(6)	Katerpillar Attack	(Microdeal)
8	(7)	Chess	(Dragon Data)*
9	(—)	Mined Out	(Quicksilva)
10	(—)	Typing Tutor	(Dragon Data)

*Cartridge
(Figures compiled by Rams & Co, London)

BBC*



1	(1)	Killer Gorilla	(Program Power)
2	(—)	Planetoid	(Acornsoft)
3	(4)	Rocket Raid	(Acornsoft)
4	(10)	Inheritance	(Simon W Hessel)
5	(—)	Painter	(A + F)
6	(2)	Great Britain Limited	(Simon W Hessel)
7	(—)	Sphinx Adventure	(Acornsoft)
8	(3)	Word Wise	(Computer Concepts)
9	(—)	Philosopher's Quest	(Acornsoft)
10	(6)	Landfall	(Virgin Games)

*Model B
(Figures compiled by Micro Management, Ipswich 0473 59181)

ZX81




1	(1)	3D Monster Maze	(New Generation)
2	(2)	Flight Simulation	(Psion)
3	(3)	QS Scramble	(Quicksilva)
4	(4)	Astro Dropout	(Silversoft)
5	(6)	Galaxians	(Artic)
6	(5)	Chess	(Psion)
7	(7)	16 Games for 1K	(J K Greye)†
8	(8)	Asteroids	(Asteroids)
9	(6)	Avenger	(Abacus)
10	(10)	Night Gunner	(Digital Integration)

All 16K except where shown. † Runs in 1K.
(Figures compiled by W H Smith & Son Ltd)

Books




1	(5)	Programming the BBC Micro *Williams*	(Newnes)
2	(1)	Vic Programmers Reference Guide *Commodore*	(Commodore)
3	(—)	Structured Programming with BBC Basic *Atherton*	(Horwood)
4	(4)	Spectrum Hardware Manual *Dickens*	(Melbourne House)
5	(7)	6502 Machine-code For Beginners *Stephenson*	(Newnes)
6	(10)	Commodore 64 Programmers Reference Guide *Commodore*	(Commodore)
7	(—)	Basic Programming On The BBC Micro *Cryer*	(Prentice-Hall)
8	(6)	6809 Assembly Language Programming *Leventhal*	(Osborne)
9	(2)	Assembly Language Programming For The BBC Micro *Birnbaum*	(Macmillan)
10	(—)	36 Educational Programs For The BBC Micro *Murray*	(Century)

(Figures compiled by Watford Technical Books, Watford 0923 23324)
(Last week's position in brackets)

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17 ——— snip-snip ———

software shocker!

AUTOMATA RUNS OUT OF ORIGINAL ADVERT IDEAS.!

is the writing on the wall for the PiMan?

FAMILY PLANNING....
send AUTOMATA yer non-violent
family entertainment games
and make munny!!
(or we'll hit you.)

Automonopoli is the classic version of ... available ... up to 5 ... moving board ... SPECTRUM ... and you ... we dare you to ... computer ... it may ...

Your BEWARE

IS this a clue?

T NY BRIDGE HAS FALLEN DOWN BEWARE THE CURSE OF PI π

NO, IT'S A BRICK

starting this week! automata's KRUMMY KOMIC STRIP (ALL WE WANT TO DO IS ENTERTAIN YOU!)

HAVE YOU EVER BEEN TO ONE OF THOSE PARTIES WHERE EVERYBODY TALKS OF NOTHING BUT COMPUTER GAMES? THIS IS WORSE (HIC) WHEN THEY ARE ALL COMPUTER GAMES!

WHEN, I JUST GOT HERE! I'VE BEEN DODGING LASERS ALL DAY!

ME TOO! IT'S DIG A HOLE, FIGHT A MONSTER PICK UP A BOX...

I SHOULD HAVE BROUGHT MY SAX. THIS PARTY'S SNOREVILLE!

SAY, HANDSOME DO YOU HAVE A MATCH?

NO BUT YOUR CIGAR IS ALREADY ALIGHT

I KNOW! I WANTED TO SET FIRE TO THE DRAPES!

DON'T TELL ME YOU'RE RUNNING SOME CROOKED INSURANCE RACKET

NO I'M AN ARSONIST

GULP!

WHIZZOOOM
ZIT ZAT ZAT ZOT

LOOK OUT! SPACE INVADERS

YEAH - THEY'RE INVADING THE BEST PART OF SPACE IN THIS PANEL LET'S GET STEWED!

WHAT A SWELEGANT ELEGANT PARTY THIIIIS IIIIIIIIIISSSS

THIS NEVER HAPPENS AT THOSE NICE QUIET LETRASET PARTIES!

TALK ABOUT PI-EYED! NEXT TIME: A JOB IN THE PIPELINE SO THE CIGARS MUST GO